

2026

MATH

Exercise Book

2nd
Prep

First term



Unit 1 - Numbers and operations on them

Lesson (1) : Irrational numbers

Lesson (2) : Real Numbers

Lesson (3) : Intervals and operations on them

Lesson (4) : Operations on real numbers

Lesson (5) : Properties of square and cube roots

Lesson (6) : Exponent rules with real numbers

Unit 1 Assessment

Unit 2 - Factorization

Lesson (1) : Factoring out the GCF (Greatest Common Factor)

Lesson (2) : Factoring Trinomials

Lesson (3) : Analysis of Special Cases

Lesson (4) : Follow - Analysis of Special Cases

Lesson (5) : Factoring by Grouping

Unit 2 Assessment

Unit 3 - Geometry

Lesson (1) : Congruence

Lesson (2) : Pythagorean Theorem and its Converse

Lesson (3) : Applications of Parallelism

Lesson (4) : Medians of a triangle

Lesson (5) : Isosceles triangle

Lesson (6) : Interior and exterior angles of polygons

Unit 3 Assessment

Unit 4 - Statistics

Lesson (1) : Cumulative Frequency Table (Less Than Type) and its Graphical Representation

Lesson (2) : Measures of Central Tendency for Grouped Frequency Table

Unit 4 Assessment

Q1 : Choose the correct answer :-

- 1 If $x < \sqrt{29} < x + 1$, $x \in \mathbb{Z}$, what is the value of x ?
(a) 4 (b) 5 (c) 6 (d) 7
- 2 Which of the following numbers is an irrational number?
(a) $\sqrt[3]{125}$ (b) $\sqrt{5}$ (c) $\sqrt{\frac{9}{25}}$ (d) $\overline{0.3}$
- 3 What is the estimate of the number $\sqrt[3]{25}$ to the nearest whole number
(a) 2 (b) 3 (c) 5 (d) 12.5
- 4 ----- $\approx \sqrt{10}$
(a) 2.99 (b) 3.71 (c) 3 (d) -3.2
- 5 The irrational number between 2 and 3 is -----
(a) $\sqrt{10}$ (b) $\sqrt{7}$ (c) $\sqrt{2}$ (d) 2.5
- 6 The irrational number between -2 and -1 is -----
(a) $-\sqrt{2}$ (b) $\sqrt{-3}$ (c) $-1\frac{1}{2}$ (d) -3
- 7 The nearest whole value to $\sqrt{26}$ is -----
(a) 3 (b) 2 (c) 5 (d) 12.5
- 8 The irrational number among the following is -----
(a) $\sqrt{\frac{1}{4}}$ (b) $\sqrt[3]{8}$ (c) $\sqrt{\frac{4}{9}}$ (d) $\sqrt{2}$
- 9 If $1 < \sqrt{n} < 2$ Which of the following is a possible value for the number n ?
(a) 1 (b) 2 (c) 4 (d) 8

- 10** Which of the following numbers is an irrational number between 2 and 3?
- (a) $\sqrt[3]{9}$ (b) $\sqrt{6.25}$ (c) $\sqrt{10}$ (d) $2.\bar{5}$
- 11** What is the estimate of the number $\sqrt{41}$ to the nearest whole number?
- (a) 36 (b) 49 (c) 6 (d) 12.5
- 12** A square with a side length of $\sqrt{3}$ cm has an area of ----- cm^2
- (a) 3 (b) 6 (c) 9 (d) $\sqrt{3}$
- 13** The length of the side of a square with an area of 6 cm^2 is -----
- (a) Natural (b) Integer (c) Rational (d) Irrational
- 14** if $x < \sqrt{26} < x + 1, x \in \mathbb{Z}$ what is the value of x ?
- (a) 25 (b) 5 (c) -5 (d) 24

Q2 : In each of the following, determine whether the number is rational or irrational :-

- | | | |
|--|--|---------------------------------------|
| 1 2.3×10^5 | 2 2.06 | 3 $2\frac{2}{3}$ |
| 4 $\sqrt[3]{0.343}$ | 5 -5 | 6 $\sqrt{\frac{1}{3}}$ |
| 7 $(-5)^0$ | 8 0 | 9 $\sqrt{\frac{25}{16}}$ |
| 10 $-\sqrt{36}$ | 11 $ -5 $ | 12 $\frac{\pi}{2}$ |
| 13 $\sqrt[3]{3\frac{3}{8}}$ | 14 $\sqrt[3]{\frac{-64}{81}}$ | 15 $\sqrt{7}$ |

Q3 : Answer the following :-

- 1** Find two consecutive integers between which each of the following numbers lies, and determine its approximate position on the number line.

a $\sqrt{13}$

.....

.....

b $-\sqrt{11}$

.....

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c $\sqrt[3]{14}$

.....

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- 2** If x is an integer, find the value of x in each of the following cases:

a $x < \sqrt{2} < x + 1$

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b $x < \sqrt{80} < x + 1$

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- 3** Find an approximate value for each of the following numbers:

a $\sqrt{11}$ $\ggg$ to the nearest hundredth

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b $\sqrt[3]{7}$ $\ggg$ to the nearest tenth

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- 4** A rectangular garden has an area of 80 m^2 , and its length is twice its width. Find both the length and the width of the garden, to the nearest meter.

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- 5** Which is greater: The side length of a square with an area of 16 cm^2 , or the diagonal of a square with an area of 9 cm^2

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- 6** Sahar shaped a piece of clay into the form of a cube with a total surface area of 300 cm^2 . Find the length of its edge. Is the edge length a rational number?

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Q1 : Put ($>$, $<$ or $=$) in each box to make the statement true .

1 14 $\sqrt{96}$

2 -2.6 $-\sqrt{7}$

3 $\sqrt{9}$ $\sqrt[3]{25}$

4 -4 $-\sqrt{16}$

Q2 : Choose the correct answer.

1 $R =$ -----

(a) $\bar{Q} \cup Q$

(b) $z^+ \cup z^-$

(c) $R^+ \cup R^-$

(d) $N \cup R^+$

2 $Q \cup \bar{Q} =$ -----

(a) $\emptyset$

(b) R

(c) Q

(d) $\bar{Q}$

3 $Q \cap \bar{Q} =$ -----

(a) $\bar{Q}$

(b) Q

(c) R

(d) $\emptyset$

4 $R - \bar{Q} =$ -----

(a) R

(b) $\emptyset$

(c) Q

(d) $\{0\}$

5 $R - Q =$ -----

(a) R

(b) $\emptyset$

(c) $\bar{Q}$

(d) $\{0\}$

6 $R^+ \cup R^- =$ -----

(a) $\emptyset$

(b) R

(c) R^*

(d) R^-

7 $R^+ \cap R^- =$ -----

(a) $\emptyset$

(b) R^+

(c) R

(d) R^-

Q3 : Answer the following.

1 Arrange the numbers ascendingly :

$$\overline{6.36}$$

,

$$6\frac{4}{5}$$

,

$$\sqrt{40}$$

,

$$7$$

2 Find the solution set in R for each of the following equations :

a $3x^3 + 13 = 67$

b $3x^2 - 1 = -13$

c $x^3 - 11 = 5$

3 Solve the following equations to the nearest hundredth ,
knowing that $X \in \mathbb{R}$:

a $\frac{3}{4}x^2 = 24$

b $x^2 - 6 = 0$

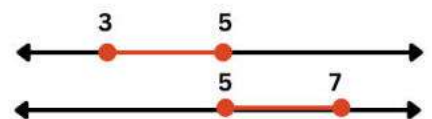
c $\frac{1}{2}x^2 - 5 = 0$

Q1 : Complete each of following using either the symbols $\in$ or $\notin$:

- | | |
|---|---|
| 1 $0 \dots\dots\dots [-1, 4[$ | 2 $ -3 \dots\dots\dots [2, \infty[$ |
| 3 $3 \dots\dots\dots [3, 5]$ | 4 $-2 \dots\dots\dots] -2, 1]$ |
| 5 $\sqrt{9} \dots\dots\dots] -3, \infty[$ | 6 $\sqrt[3]{-1} \dots\dots\dots] -\infty, 1[$ |

Q2 : Choose the correct answer.

- 1** If $]2, 5[\in a$ then a can be equal to which of the following ?
 (a) 1 (b) 2 (c) 4 (d) 5
- 2** If $] -1, 3[\notin a$ then a can be equal to which of the following ?
 (a) -1 (b) 0 (c) 2 (d) 1
- 3** If $] -5, 7[\notin x$ then which of the following is true ?
 (a) $7 \in x$ (b) $-5 \notin x$ (c) $0 \notin x$ (d) $-2 \notin x$
- 4** What is the resulting interval from $]2, 5[\cup \{2\}$?
 (a) $]2, 5[$ (b) $[2, 5]$ (c) $]2, 5]$ (d) $[2, 5[$
- 5** Which of the following intervals does the number $-\sqrt{7}$ belong to ?
 (a) $[-2, -1]$ (b) $[-3, 2]$ (c) $[-4, -3]$ (d) $[-7, -6]$
- 6** Which of the following represents $x \cap y$?
 (a) $\{5\}$ (b) $[3, 7[$ (c) $[3, 5[$ (d) $\emptyset$



Q3 : Answer the following:

1 If $x =] - \infty, 3]$ and $Y = [-4, \infty [$, find using the number line .

a $X \cup Y$

.....

.....

b $X \cap Y$

.....

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c $X - Y$

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d $Y - X$

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.....

2 If $x = [2, 5 [$ and $Y = [-1, 3 [$, find using the number line .

a $X \cup Y$

.....

.....

b $X \cap Y$

.....

.....

c $X - Y$

.....

.....

d $Y - X$

.....

.....

3 $[5, 7[\cap [-1, 4]$

4 $[-1, 5] -]-1, 5[$

5 $[2, \infty[\cup]-\infty, 3]$

6 $] -\infty, 3] \cap [-4, \infty[$

7 $] -\infty, 3] - [-1, \infty[$

8 $] -\infty, 3] - [-3, 1]$

9 If $X =]-2, 2[$ and $Y = [1, 4]$, find using the number line.

a $X \cup Y$

b $X \cap Y$

c $X - Y$

d) $Y - X$

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10 If $A =] -1 , 3]$ and $B =] - \infty , 3 [$, find using the number line .

a) $B \cup A$

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b) $B \cap A$

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c) $B - A$

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11 If $A =] -5 , \infty [$ and $B =] -\infty , 2]$, find using the number line .

a) $B \cup A$

.....

.....

b) $B \cap A$

.....

.....

c) $B - A$

.....

.....

Q4 : find using the number line .

1 $[3, 8[- [2, 7]$

2 $[-2, 3] \cup [2, 5[$

3 $[-5, 1] \cap]-1, 3[$

4 $] -\infty, 7[\cap [3, \infty[$

5 X' where $X = [4, 8[$

6 $\mathbb{R}^- - [-2, 0[$

7 $\mathbb{R} \cap [2, 5[$

8 $]5, \infty[\cap]2, 5]$

9 $\mathbb{R}^- \cup \mathbb{R}^*$

10 $\mathbb{R}^* \cup]0, 2]$

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11 $\{3, 5\} \cup]3, 5[$

.....

.....

12 $\{3, 7\} \cap [3, 7[$

.....

.....

13 $[2, 5] - \{2, 5\}$

.....

.....

14 $[0, 5] - \{5\}$

.....

.....

15 $\mathbb{Z}^+ \cap]-1, 2[$

.....

.....

16 $\mathbb{Z}^- \cap]-2, 3]$

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.....

17 $\mathbb{N} \cap [-3, 0[$

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Q5 : Analysis and integration of materials .

- 1** Lily decided to store two types of food in the refrigerator :
The first type is fresh milk, which is preferably stored at a temperature from 1°C to 4°C .
The second type is fresh meat, which is preferably stored at a temperature from -2°C to 2°C .
What is the temperature range Lily can set the fridge to store both types at the same time without either getting spoiled?

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- 2** Amal and Iman are two sisters who wanted to organize their Saturday to take care of their elderly mother, ensuring that their mother would not be alone at any time during the day until their father returns home.
Amal is available from 10:00 AM to 2:00 PM.
Iman is available from 12:00 PM to 4:00 PM.
What is the time interval during which at least one of them is with their mother?

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Q1 : Find the result of each of the following in simplest form :

1 $\sqrt{2} (5 + \sqrt{2})$

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.....

2 $2 (\sqrt{5} + \sqrt{2})$

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.....

Q2 : Find the result of each of the following operation :

1 $(4 - 3\sqrt{2}) (4 + 3\sqrt{2})$

.....
.....

2 $(\sqrt{2} + \sqrt{1}) (\sqrt{2} - \sqrt{1})$

.....
.....

Q3 : Answer the following :

1 If $y = \sqrt{3} + 2$, $x = \frac{1}{\sqrt{3} + 2}$ Find the value of each the following in simplest :

a xy

.....
.....

b $(x + y)^2$

.....
.....

c $x^2 + y^2$

.....
.....

- 2** Make the denominator in each of the following a whole number ,
and write the number in its simplest form

a $\frac{1}{\sqrt{15}}$

.....

.....

b $\frac{\sqrt{2} + 3}{\sqrt{2}}$

.....

.....

c $\frac{30}{\sqrt{10}}$

.....

.....

d $\frac{10}{2\sqrt{5}}$

.....

.....

- 3** Omar built two flower beds in his home garden for planting roses.
One of them is rectangular with dimensions $(5 - \sqrt{7})$ m, $(5 + \sqrt{7})$ m
and the other is square with the same area as the first bed.
Find the perimeter of each flower bed.
Which one has the greater perimeter?"

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Q4 : Choose the correct answer :-

1 If $a + \sqrt{5} = 0$ What is the value of a ?

- (a) 0 (b) $\sqrt{5}$ (c) $-\sqrt{5}$ (d) $\frac{1}{\sqrt{5}}$

2 What is the multiplicative inverse of the number $\sqrt{3} - 2$

- (a) $2 - \sqrt{3}$ (b) $\sqrt{3} + 2$ (c) $-\sqrt{3} - 2$ (d) $\sqrt{3} - 2$

3 What is the value of $\sqrt{3} + \sqrt{3}$?

- (a) $\sqrt{3}$ (b) $2\sqrt{3}$ (c) $\sqrt{6}$ (d) 3

4 If $a \times \sqrt{2} = 1$ What is the value of a ?

- (a) 1 (b) $\sqrt{2}$ (c) $-\sqrt{2}$ (d) $\frac{\sqrt{2}}{2}$

5 If $a \sqrt{5} - 4\sqrt{5} = 3\sqrt{5}$, then -----

- (a) $a = -1$ (b) $a = 1$ (c) $a = 7$ (d) $a = 10$

6 If $\sqrt[3]{5} + 3a = 4\sqrt[3]{5}$, then -----

- (a) $a = \sqrt{5}$ (b) $a = \sqrt[3]{5}$ (c) $a = 5$ (d) $a = 1$

7 If $(2\sqrt{3})^n = 12$, then -----

- (a) $n = 2$ (b) $n = 3$ (c) $n = 4$ (d) $n = 6$

8 What is additive of the number $\frac{7}{\sqrt{7}}$ in simplest form ?

- (a) $\frac{\sqrt{7}}{7}$ (b) 7 (c) $-\sqrt{7}$ (d) -7

Q5 : Analysis and integration of materials .

1 Find the area of each of the following shapes in simplest form.

a

rectangle

$$(2\sqrt{5} + \sqrt{3})$$

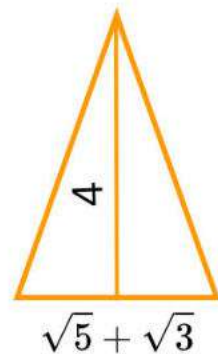
$$(2\sqrt{5} - \sqrt{3})$$

b

square

$$3\sqrt{5}$$

c



Q1 :Simplify each of the following its simplest form :

1 $3\sqrt{2} + \sqrt{8} - \sqrt{18}$

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.....

2 $\sqrt{50} + \sqrt{8}$

.....
.....

3 $\sqrt{20} - \sqrt{45}$

.....
.....

4 $\sqrt{98} - \sqrt{128} - \sqrt{18} + 4\sqrt{2}$

.....
.....

5 $\sqrt[3]{\frac{1}{4}} + \frac{2\sqrt[3]{5} \times \sqrt[3]{54}}{\sqrt[3]{10}}$

.....
.....

6 $3\sqrt{\frac{1}{3}} - \sqrt{27}$

.....
.....

7 $3\sqrt{8} + \sqrt{18} - \sqrt{32}$

.....
.....

8 $\frac{\sqrt{98} + \sqrt{8}}{\sqrt{18}}$

.....
.....

9 $2\sqrt[3]{\frac{1}{4}} + \sqrt[3]{16}$

.....

.....

10 $\frac{3\sqrt[3]{32} - 3\sqrt[3]{4}}{\sqrt[3]{4}}$

.....

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Q2 :Find the value of each of the following in its simplest form :

1 $\sqrt[3]{16} - \sqrt[3]{2}$

.....

.....

2 $\frac{\sqrt[3]{72}}{\sqrt[3]{9}}$

.....

.....

3 $\sqrt[3]{2} \times \sqrt[3]{32}$

.....

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4 $\frac{4\sqrt[3]{-54}}{2\sqrt[3]{-2}}$

.....

.....

5 $\sqrt[3]{125} - \sqrt[3]{24}$

.....

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Q3 : Choose the correct answer :-

- 1 If $a \sqrt[3]{2} = \sqrt[3]{3} \times \sqrt[3]{10}$ What is the value of a ?
 (a) 30 (b) $\sqrt[3]{30}$ (c) 15 (d) $\sqrt[3]{15}$
- 2 What is the value of $\sqrt{18} + \sqrt{32}$?
 (a) $\sqrt{50}$ (b) $4\sqrt{7}$ (c) $7\sqrt{2}$ (d) $5\sqrt{4}$
- 3 Which of the following is correct ?
 (a) $\sqrt{48} = 3\sqrt{6}$ (b) $\sqrt{12} = 2\sqrt{3}$ (c) $\sqrt{40} = 4\sqrt{10}$ (d) $\sqrt{32} = 8\sqrt{2}$
- 4 Which of the following is equivalent to $\sqrt[3]{5} \times \sqrt[3]{25}$?
 (a) 5 (b) $\sqrt[3]{30}$ (c) $5\sqrt[3]{5}$ (d) 125
- 5 If $\frac{\sqrt{3}}{a} = \frac{\sqrt{2}}{\sqrt{6}}$ What is the value of a ?
 (a) 3 (b) 9 (c) $\sqrt{3}$ (d) $\sqrt{6}$
- 6 If $2\sqrt{3} \times 4a = 8\sqrt{6}$ What is the value of a ?
 (a) $\sqrt{2}$ (b) $\sqrt{3}$ (c) 2 (d) $\sqrt{6}$
- 7 If $\sqrt{160} = x\sqrt{10}$ what is the value of x ?
 (a) 8 (b) 6 (c) 4 (d) 3
- 8 Which of the following is equivalent to $\frac{\sqrt{25}}{\sqrt{15}}$
 (a) $\frac{5}{15}$ (b) $\frac{\sqrt{5}}{3}$ (c) $\frac{5}{3}$ (d) $\frac{\sqrt{15}}{3}$
- 9 Which of the following is equivalent to $\frac{\sqrt{72}}{\sqrt{2}}$
 (a) $2\sqrt{6}$ (b) $\sqrt{70}$ (c) $6\sqrt{2}$ (d) 6
- 10 If $x + \sqrt{28} = \sqrt{7}$ What is the value of x ?
 (a) $\sqrt{21}$ (b) $-\sqrt{21}$ (c) $-\sqrt{7}$ (d) $\sqrt{7}$

Q4 :Answer the following:

1 If $x = \sqrt{3} + \sqrt{2}$, $y = \sqrt{3} - \sqrt{2}$

Find the value of each of following in its simplest form :

a $\frac{x}{y}$

.....

.....

b $x \times y$

.....

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2 Express each of the following in the form $a\sqrt[3]{b}$ where **a** and **b** are integers , and b is the smallest possible positive value.

a $\sqrt[3]{16}$

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b $\sqrt[3]{-54}$

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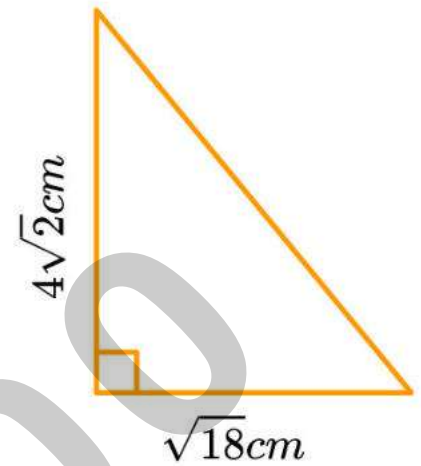
c $\sqrt[3]{250}$

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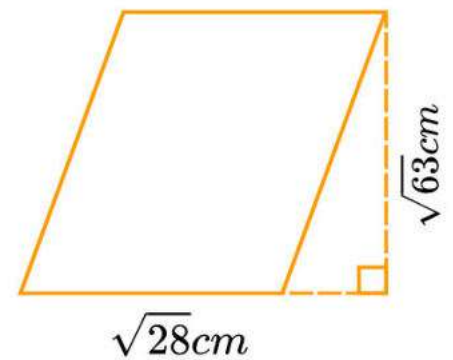
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3 Calculate the area of each of the following shaded shapes :

a



a



Q1 :Simplify each of the following its simplest form :

1
$$\frac{(-2xy)^{-3}}{x^{-4}y^{-3}}$$

.....

.....

2
$$\frac{(\sqrt{3})^3 \times 24}{(\sqrt{3})^5 \times (\sqrt{3})^4}$$

.....

.....

3
$$\frac{(\sqrt{18})^2 \times (\sqrt{2})^{-1}}{(\sqrt{8})^{-1}}$$

.....

.....

4
$$\frac{-3a^2b \times 4a^{-1}b^{-2}}{12(ab)^{-2}}$$

.....

.....

5
$$\left(\frac{2\sqrt{3}}{3\sqrt{2}}\right)^4$$

.....

.....

6
$$\frac{(2)^{2n+1} \times (3)^{2n+1}}{(6)^{2n}}$$

.....

.....

7
$$\frac{(\sqrt{7})^{-3} \times (\sqrt{7})^{-4}}{(\sqrt{7})^{-9}}$$

.....

.....

8
$$\frac{(\sqrt{3})^8 \times (\sqrt{3})^7}{(\sqrt{3})^6}$$

.....

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9
$$\frac{3^{x+2} \times 9^x}{(27)^x}$$

.....

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10
$$\frac{3^{x-1} \times 2^{2x}}{(12)^x}$$

.....

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Q2 : Answer the following:

Simplify the following to its simplest form , and find the value of result when $n = 1$

$$\frac{(\sqrt{6})^{n+2} \times (\sqrt{3})^n}{4 \times (\sqrt{2})^{n-2}}$$

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Q3 : Choose the correct answer :-

- 1 If $2^x = 3$ What is 2^{x+1} ?
(a) 9 (b) 5 (c) 6 (d) 4
- 2 What is $\frac{1}{5}$ of number $(\sqrt[3]{5})^6$?
(a) $(\sqrt[3]{5})^8$ (b) $\sqrt[3]{5}$ (c) 25 (d) 5
- 3 What is the result of $\frac{(ab)^3}{b^3}$?
(a) $\frac{a^2}{b^3}$ (b) $\frac{a^3}{b^2}$ (c) $\frac{a}{b}$ (d) a^3
- 4 What is the value of $(\frac{7}{\sqrt{7}})^0 - \frac{7}{(\sqrt{7})^0}$?
(a) 5 (b) $\sqrt[3]{30}$ (c) $5\sqrt[3]{5}$ (d) 125
- 5 What is the perimeter of a square whose area is $a \text{ cm}^2$?
(a) $4a \text{ cm}$ (b) $4\sqrt{a} \text{ cm}$ (c) $(\sqrt{a})^4 \text{ cm}$ (d) $a^4 \text{ cm}$
- 6 What is the result of $(\frac{\sqrt{5}}{10})^{-1}$?
(a) $\frac{5}{\sqrt{10}}$ (b) $5\sqrt{2}$ (c) 2 (d) $2\sqrt{5}$
- 7 If $2^{x-1} = 1$ what is the value of x ?
(a) -2 (b) -1 (c) 1 (d) 0
- 8 What is the value of $4^2 + 4^2 + 4^2 + 4^2$?
(a) 4^{16} (b) 4^8 (c) 4^3 (d) 4^2

9 If $(\sqrt{6})^x \times \sqrt{6} = 1$ what is the value of x ?

(a) -2

(b) -1

(c) 1

(d) 0

10 What is the result of $(\sqrt{3})^3 \times (\sqrt{3})^{-4}$

(a) $\frac{1}{3}$

(b) 3

(c) $\frac{\sqrt{3}}{3}$

(d) $\sqrt{3}$

Q4 : Analysis and integration of materials .

If the Sinai Peninsula makes up about 6% of the area of the Arab Republic of Egypt, which is approximately 1,060,000 km², what is the approximate area of the Sinai Peninsula in square kilometers?

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Q1 : Choose the correct answer :-

- 1 If $x < \sqrt{19} < x + 1$, $x \in \mathbb{Z}$, what is the value of x ?
- (a) 4 (b) 5 (c) 6 (d) 7
- 2 What is the estimate of the number $\sqrt{41}$ to the nearest whole number?
- (a) 36 (b) 49 (c) 6 (d) 12.5
- 3 $\mathbb{R} - \mathbb{Q} = \text{-----}$
- (a) $\mathbb{R}$ (b) $\emptyset$ (c) $\mathbb{Q}$ (d) $\{0\}$
- 4 What is the resulting interval from $]2, 5[\cup \{2\}$?
- (a) $]2, 5[$ (b) $[2, 5]$ (c) $]2, 5]$ (d) $[2, 5[$
- 5 What is the multiplicative inverse of the number $\sqrt{3} - 2$
- (a) $2 - \sqrt{3}$ (b) $\sqrt{3} + 2$ (c) $-\sqrt{3} - 2$ (d) $\sqrt{3} - 2$
- 6 If $(2\sqrt{3})^n = 12$, then -----
- (a) $n = 2$ (b) $n = 3$ (c) $n = 4$ (d) $n = 6$
- 7 If $\sqrt{160} = x\sqrt{10}$ what is the value of x ?
- (a) 8 (b) 6 (c) 4 (d) 3
- 8 What is the value of $\sqrt{18} + \sqrt{32}$?
- (a) $\sqrt{50}$ (b) $4\sqrt{7}$ (c) $7\sqrt{2}$ (d) $5\sqrt{4}$
- 9 What is the value of $4^2 + 4^2 + 4^2 + 4^2$?
- (a) 4^{16} (b) 4^8 (c) 4^3 (d) 4^2

Q2 : Answer the following :-

- 1** A rectangular garden has an area of 160 m^2 , and its length is twice its width. Find both the length and the width of the garden, to the nearest meter.

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- 2** Find the solution set in R for each of the following equations :

a $3x^3 + 13 = 67$

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.....

b $3x^2 - 1 = -13$

.....

.....

- 3** If $A =] -1 , 3]$ and $B =] -\infty , 3 [$, find using the number line .

a $B \cup A$

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.....

b $B \cap A$

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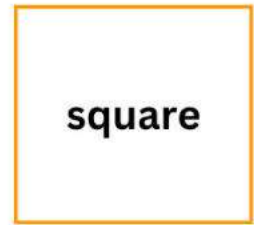
c $B - A$

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- 4 Find the area of the shape in simplest form.

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$$3\sqrt{5}$$

- 5 Simplify the following in simplest form.

$$\sqrt[3]{16} - \sqrt[3]{2}$$

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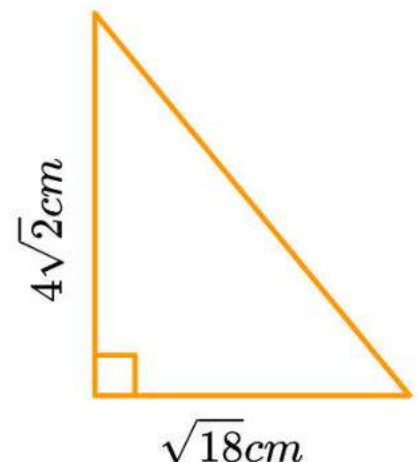
- 6 Simplify the following in simplest form.

$$\frac{-3a^2b \times 4a^{-1}b^{-2}}{12(ab)^{-2}}$$

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- 7 Calculate the area of each of the following shaded shapes :

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Q1 : Factor each of the following polynomials by taking the Greatest Common Factor (G.C.F.):

1 $15a - 25b$

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2 $4m - mn$

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3 $18a + 27ab$

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4 $12y + 4$

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5 $-4x^5 + 6x^4 - 8x^3 + 12x^2$

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6 $2a - 4ab - 6ac$

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7 $-7k - 49m$

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8 $16a^6 - 4a^4 + 12a^4$

.....

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9 $9a^2b - 6ab^2 + 3ab$

.....

.....

10 $x^2y^3 + x^2y^2 + x^3y^2$

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11 $(x + 2)^3 - 2(x + 2)^2$

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12 $(2x - 3)^2 - 2(2x - 3)$

.....

.....

13 $(7x - 5)^2 - 7x + 5$

14 $3x + 6 - (x + 2)^2$

15 $a(b + 5) + 2(b + 5)$

16 $(4x - 1) - y(4x - 1)$

Q2 : Choose the correct answer :-

1 $x(a + b) + y(a + b) = \text{-----}$

- (a) $(x - y)(a - b)$ (b) $(x + y)(a + b)$ (c) $(x - y)(a + b)$ (d) $(x + y)(a - b)$

2 Which of the following is a factorization of the polynomial $16x^2 - 24x^3$ by taking the G.C.F. ?

- (a) $8x(2x - 3x^2)$ (b) $4x^2(4 - 6x)$ (c) $8x^2(2 - 3x)$ (d) $8(2x^2 - 3x^3)$

3 If $x(a - b) - y(a - b)$, $x - y = 10$, and $a - b = 7$, then the value is -----

- (a) 3 (b) 17 (c) 51 (d) 70

4 $6a - 8b = \text{-----}$

- (a) $6(a - 2b)$ (b) $4(2a - 4b)$ (c) $2(3a - 4b)$ (d) $14(a - b)$

5 $x^2y - xy^2 = \text{-----}$

- (a) $xy(x - y)$ (b) $x^2y(1 - y)$ (c) $xy^2(x - 1)$ (d) $xy(y - x)$

6 What is (G.C.F.) of the terms of the polynomial $12x^2 - 8x$?

- (a) 2 (b) 4 (c) $2x$ (d) $4x$

Q3 : Find the solution set of each of the following equations in R:

1 $x^2 = 5x$

2 $x^2 - x = 0$

3 $4x^2 + 8x = 0$

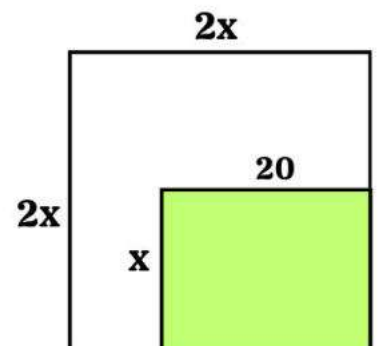
4 $5x^2 - x = 0$

5 $12x^2 - 4x = 0$

6 $2x^2 - 3x = 0$

Q4 : Answer the following :

- 1 An engineer has a square-shaped plot of land with a side length of $(2x)$ meters. He wants to build a house on it in the shape of a rectangle with dimensions x m and 20 m, And he plans to use the remaining area as a garden, as shown in the figure. Find the area of the garden, and write the result as a product of two factors using factoring by taking (G.C.F).



2 A dolphin jumps upward so that its height (in meters) after t seconds is given by the expression: $32t - 16t^2$

Write the dolphin's height as a product of two factors by factoring out (G.C.F.). Then, find its height when $t = 1$.

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Q1 : Factor each of the following.

1 $X^2 - 15Xy + 36y^2$

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2 $b^2 + 3bl - 10l^2$

3 $X^2 + 5Xy + 6y^2$

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.....

4 $X^2 - 5Xy - 24y^2$

5 $X^2 - 17X + 30$

.....
.....

6 $X^2 - 7X + 12$

7 $X^2 - 5X - 14$

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.....

8 $X^2 + 11X + 30$

9 $X^2 - 6X - 16$

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10 $X^2 - 3X - 10$

11 $X^2 + 8X + 15$

.....
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12 $X^2 + 4X - 12$

13 $y^2 + y - 6$

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.....

14 $2X^2 + 3X + 1$

15 $a^2 + 22a - 75$

16 $8X^2 + 28X - 60$

17 $a^2 + 15a - 34$

18 $6X^2 - 21X + 18$

19 $8X^3 - 27X^2 - 20X$

20 $2a^2 + 28a + 96$

21 $5X^2 - 10X - 15$

22 $25m^2 - 10m + 15$

23 $3a^2 + 7a + 2$

24 $X^2 - 3X - 28$

25 $6X^2 - 11 + 3$

26 $3X^2 - 14X - 5$

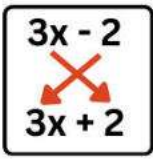
27 $5K^2 - 7K + 2$

28 $5X^2 - 4X - 12$

29 $3X^2 + 10X + 8$

30 $5a^2 - 18a + 16$

Q2 : Choose the correct answer :-

- 1 If $(x - 5)$ is one of the factors of the trinomial: $2x^2 - 7x - 15$ What is the other factor?
- (a) $x + 3$ (b) $2x - 3$ (c) $2x + 3$ (d) $x - 3$
- 2 Which of the following factorizations represents the factorization of the polynomial $9x^2 - 9x - 4$?
- (a)  (b)  (c)  (d) 
- 3 Which of the following represents the factorization of the polynomial $x^2 + x - 20$?
- (a) $(x - 4)(x + 5)$ (b) $(x + 4)(x + 5)$ (c) $(x - 4)(x - 5)$ (d) $(x + 4)(x - 5)$
- 4 If $(x - 3)(x + 5) = 0$ Which of the following is correct ?
- (a) $x = 5$ or $x = 3$ (b) $x = -5$ or $x = 3$ (c) $x = 5$ or $x = -3$ (d) $x = -5$ or $x = 3$
- 5 If : $3x - 2y = 6$, $2x + 3y = 5$ Find the value of: $(x^2 + 5xy - 6y^2)$
- (a) 10 (b) 11 (c) 12 (d) 30
- 6 If : $(x + 3)(x + b) = x^2 + ax + 15$ What is the value of $a + b$?
- (a) 5 (b) 8 (c) 13 (d) 40
- 7 If $(x - a)(x - b) = 2x^2 - 11x + 28$ What is the value of $a + b$?
- (a) 5 (b) 8 (c) 13 (d) 40

Q1 : Analyze the following:

1 $6X^3 + 24X^2 + 24X$

2 $9a^2 + 6ab + b^2$

3 $8y^2 - 12y + 12$

4 $m^2 - 2m + 1$

5 $25X^2 - 10X + 1$

6 $\frac{1}{4}X^2 - 2X + 4$

7 $9X^2 + 6ab + b^2$

8 $X^2 + 24X^2 + 24X$

Q2 : Complete the missing term :

1 $a^2 - 6a + \text{-----}$

2 $4X^2 \text{ ----- } +1$

3 $4a^2 + \text{-----} 36b$

Q3 :Indicate which of the following quantities is a perfect square.

1 $9X^2 + 15Xy + 25y^2$

2 $a^2 + 9$

3 $8y^2 - 12y + 12$

4 $l^2 - 8ml + 16m^2$

5 $X^2 - 12X + 36$

6 $25X^2 + 15Xy + 25y^2$

Q1: Analyze each of the following:

1 $(X + 3)^3 + 64$

2 $4X^4 + 4000X$

3 $X^3 - 25X$

4 $a^2 - 4b^2$

5 $X^4 + 64X$

6 $X^3 + 8$

7 $64X^3 - 125y^3$

8 $25 - 9X^2$

9 $X^4 - 81$

10 $X^2 - \frac{4}{81}$

11 $X^2 - 4$

12 $49y^2 - 1$

13 $64X^3 + 27$

14 $2X^2 + 16$

15 $X^3 - 1$

16 $8X^3 - 125$

17 $125X^3 + \frac{1}{8}$

18 $\frac{1}{5}X^2 - 5$

19 $2XY^4 + 16YX^4$

20 $-27X^2 + 75$

21 $1 - 4a^2b^2$

22 $X^3 + 27$

23 $K^2 - 36m^2$

24 $y^3 - 8$

25 $212y - y^3$

26 $20X^3 + 16$

27 $54X^3 + 16$

28 $a^3 - 125$

29 $512X^3 - Y^3$

30 $3X^3 - 81$

31 $a^2 - 25$

32 $225C^2 - b^2$

33 $16X^2 - 9$

34 $49y^2 - 1$

35 $2X^2 - 32$

36 $X^4 - 1$

Q2 :Answer the following :-

1 Solve the following equation in R :

$$X^3 = 25X$$

- 2** Data is stored in storage units in the form of cubic units.
A first-generation storage unit can hold $216x^3$ data units."
A second-generation storage unit has a capacity of $343y^3$ data units.
Find the sum of their capacities in the form of a product of factors.
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-
-

Q3: Choose the correct answer :-

- 1** If $ax^3 - 27 = (2x - 3)(4x + bx + 9)$, What is the value of a b ?
(a) 6 (b) 12 (c) 24 (d) 48
- 2** If $x - y = -2$, $x^2 - y^2 = -16$, What is the value of Y, x ?
(a) 2 (b) 4 (c) 8 (d) 16
- 3** If $ax^2 - b = (3x - 2)(3x + 2)$, What is the value of a + b ?
(a) -13 (b) 13 (c) -5 (d) 5
- 4** If $x^2 - b^2 = (x - 3)(x + 3)$, What is the value of b ?
(a) ± 1 (b) ± 3 (c) ± 6 (d) ± 9

Q1 : Choose the correct answer :-

- 1 If $x^3 + 5x^2 - 4x - 20 = (x + a)(x + b)(x + c)$,What is the value of $a + b + c$?
 (a) 2 (b) 5 (c) 7 (d) 9
- 2 If: $x^2 + a = 12$, $x + b = 5$,What is the numerical value of the expression $(x^3 + bx^2 + ax + ab)$?
 (a) 7 (b) 17 (c) 30 (d) 60
- 3 when completing the square for the expression : $(x^2 + 9)$ we add to it -----
 (a) 3x (b) 6x (c) 9x (d) 12x
- 4 when completing the square for the expression : $(x^2 + 12x)$ we add to it -----
 (a) 9 (b) 36 (c) 9 (d) 36
- 5 If $xy + 5x + 7y + 35 = (x + a)(y + b)$, What is the value of $a - b$?
 (a) 2 (b) -2 (c) 12 (d) -12
- 6 If $(x^2 + 2x + 2)$ One of factors of the expression $(X^4 + 4)$ What is the other factor?
 (a) $x^2 - 2x + 2$ (b) $x^2 - 2x - 2$ (c) $x^2 + x + 2$ (d) $x^2 - x + 2$
- 7 $x^2 - ax + bx - ab =$ -----
 (a) $(x + a)(x + b)$ (b) $(x + a)(x - b)$ (c) $(x - a)(x + b)$ (d) $(-a)(x - b)$

Q2 : Factor the following trinomial using factoring by grouping:-

$$2x^2 + 5x + 3$$

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Q3 :Completely factor each of the following:-

1 $64X^4 + y^4$

2 $5a^2b - 10a^2b^2 + 4b^2 - 8b^3$

3 $X^2 - a^2 - 2X + 1$

4 $4X^2 - 12Xy + 9y^2 - 49$

5 $m^4 + 1$

6 $16X^4 + 20a^2b^2 + 9b^2$

7 $y^4 + 23y^2 + 1$

8 $X^2 - y^2 - 6X - 6y$

9 $6m - n + 3mn - 2$

10 $X^2 - 2X - Xy + 2y$

11 $11X^3 - 6X^2 + 11X - 6$

12 $12y + 2X - 8Xy - 3$

13 $X^4 + 2X^3 - 9X^2 - 18X$

14 $m^3 + n^3 - m - n$

15 $aX + bX + b + a$

16 $45X^3 + 20X^2 + 9X + 4$

17 $X^4 + 4y^4$

18 $X^4 - 11X^2 + 1$

19 $a^4 + a^2 + b^4 - b^8$

20 $K^5 + 5K^3 + 9K$

21 $4X^2 (4X^2 - 7y^2) + y^4$

Q4 : Find the solution set of each of the following equations in R :

1 $X^2 + 12X + 15 = 0$

2 $X^3 + X^2 - 4X = 4$

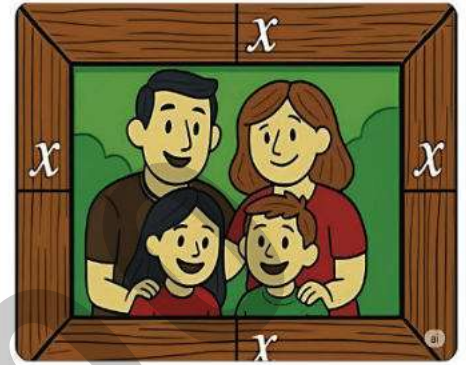
Q5 : analysis and integration of materials:

A picture is surrounded by a frame of thickness x inches, as shown in the figure.

If the area of the picture is:

$(4x^3 + 6x^2 + 2x + 3)$ square inches

Find the possible dimensions of the picture and the frame together in terms of x .



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Q1 : Choose the correct answer :-

- 1 If $x(a - b) - y(a - b)$, $x - y = 10$, and $a - b = 7$, then the value is -----
(a) 3 (b) 17 (c) 51 (d) 70
- 2 What is (G.C.F.) of the terms of the polynomial $12x^2 - 8x$?
(a) 2 (b) 4 (c) $2x$ (d) $4x$
- 3 If $(x - 5)$ is one of the factors of the trinomial: $2x^2 - 7x - 15$ What is the other factor?
(a) $x + 3$ (b) $2x - 3$ (c) $2x + 3$ (d) $x - 3$
- 4 If: $3x - 2y = 6$, $2x + 3y = 5$ Find the value of: $(x^2 + 5xy - 6y^2)$
(a) 10 (b) 11 (c) 12 (d) 30
- 5 If $x - y = -2$, $x^2 - y^2 = -16$,What is the value of Y , x ?
(a) 2 (b) 4 (c) 8 (d) 16
- 6 If $x^2 - b^2 = (x - 3)(x + 3)$, What is the value of b ?
(a) ± 1 (b) ± 3 (c) ± 6 (d) ± 9
- 7 If: $x^2 + a = 12$, $x + b = 5$,What is the numerical value of the expression $(x^3 + bx^2 + ax + ab)$?
(a) 7 (b) 17 (c) 30 (d) 60
- 8 $x^2 - ax + bx - ab = \text{-----}$
(a) $(x + a)(x + b)$ (b) $(x + a)(x - b)$ (c) $(x - a)(x + b)$ (d) $(-a)(x - b)$
- 9 when completing the square for the expression : $(x^2 + 12x)$ we add to it -----
(a) 9 (b) 36 (c) 9 (d) 36

Q2 : Answer the following :

1 Find the solution set of each of the following equations in R:

a $4x^2 + 8x = 0$

b $2x^2 - 3x = 0$

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2 Factor each of the following.

a $X^2 + 5Xy + 6y^2$

b $6X^2 - 21X + 18$

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3 Indicate which of the following quantities is a perfect square.

a $9X^2 + 15Xy + 25y^2$

b $25X^2 + 15Xy + 25y^2$

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4 Solve the following equation in R :

$X^3 = 25X$

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.....

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5 Completely factor each of the following :-

a $6m - n + 3mn - 2$

b $12y + 2X - 8Xy - 3$

6 Find the solution set of each of the following equations in R :

$X^3 + X^2 - 4X = 4$

7 Analyze each of the following :

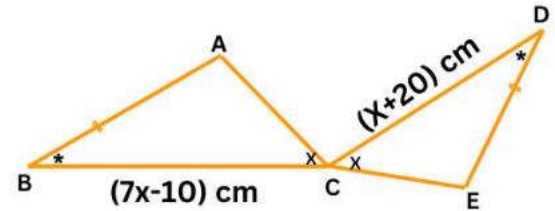
a $64X^3 - 125y^3$

b $49y^2 - 1$

Q1 : Choose the correct answer :-

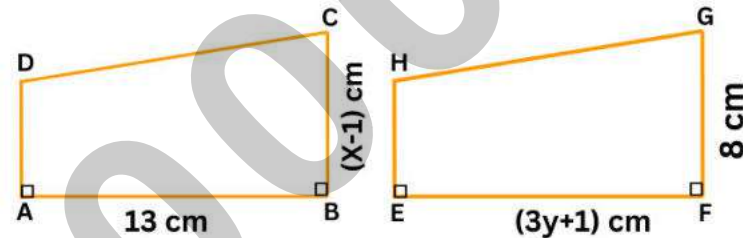
1 In the given figure :What is the length of $\overline{BC}$?

- (a) 5 cm (b) 7 cm
(c) 20 cm (d) 25 cm



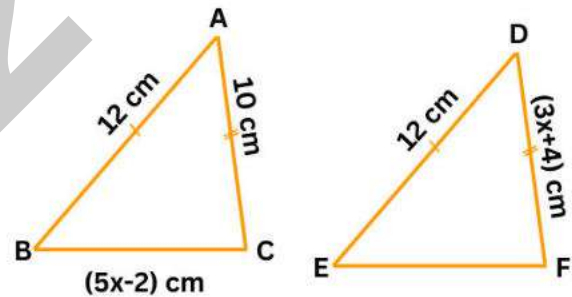
2 In the given figure :If polygon EFGH is an image of polygon ABCD by a translation , What is the value of $X+Y$?

- (a) 16 (b) 9
(c) 4 (d) 13



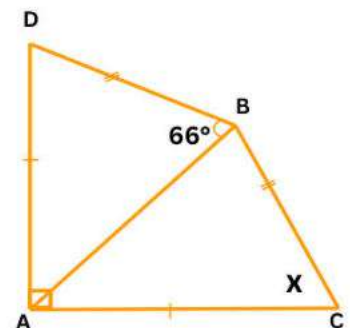
3 In the given figure :What is the length of $\overline{EF}$?

- (a) 6 cm (b) 10 cm
(c) 8 cm (d) 12 cm



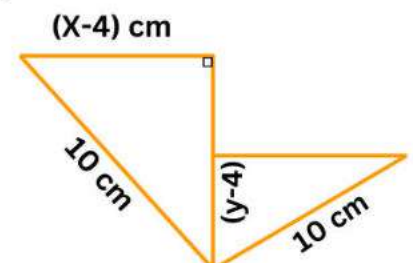
4 In the following figure :What is the value of X ?

- (a) 66 (b) 69
(c) 45 (d) 34



5 In the following figure :What is the value of $X-Y$?

- (a) 9 (b) 5
(c) 6 (d) 1

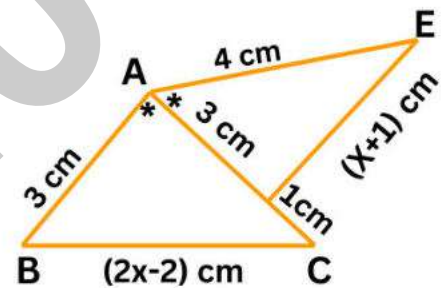


Q2 : Complete the following :

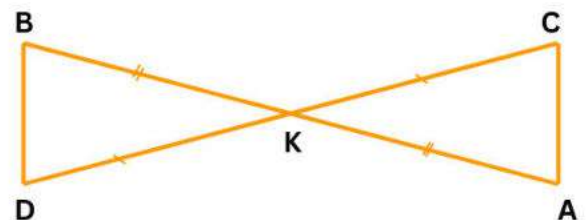
- 1 Two triangle are congruent if each ----- in one triangle is equal to its corresponding one in the other triangle.
- 2 Two triangles are congruent if two sides and the ----- are equal in both triangles.
- 3 Two right-angled triangles are congruent if the ----- are equal in both triangle.
- 4 Two triangles are congruent if two angles and the ----- in one triangle are equal to their corresponding parts in the other triangle.

Q3 : Answer the following :

- 1 In the given figure:
prove that :
 $\triangle ABC \cong \triangle ADE$

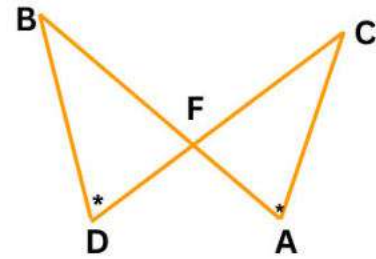


- 2 In the given figure:
 $BK = AK$, $AB \cap CD = \{K\}$, $DK = CK$
Are $\triangle AKC$ and $\triangle BKD$ congruent ? Why ?



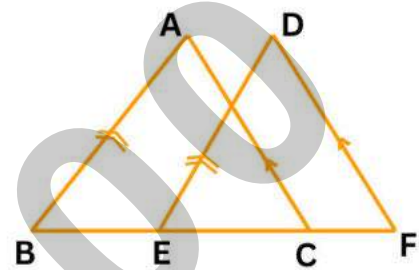
3 In the given figure:

$\angle A = \angle D$, $DF = AF$, $\overline{AB} \cap \overline{CD} = \{F\}$
Are $\triangle ACF$ and $\triangle DBF$ congruent > Why?
Then deduce that : $BF = CF$



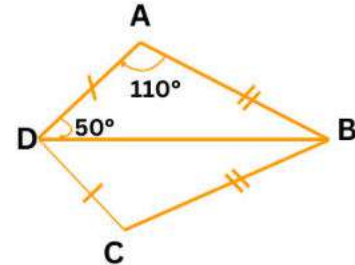
4 In the given figure:

$\overline{BA} \parallel \overline{ED}$, $\overline{CA} \parallel \overline{FD}$ $\overline{BE} \cong \overline{FC}$
Prove that:
 $\triangle ABC \cong \triangle DEF$



5 In the given figure:

$DC = AD$, $BC = AB$
 $m(\angle BAD) = 110^\circ$, $m(\angle ADB) = 30^\circ$
Find $m(\angle ABC)$

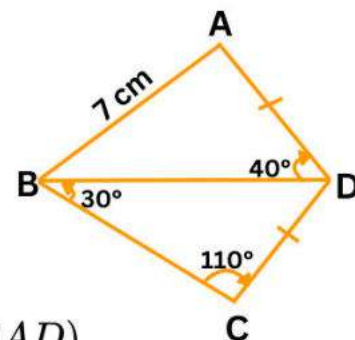


6 In the given figure :

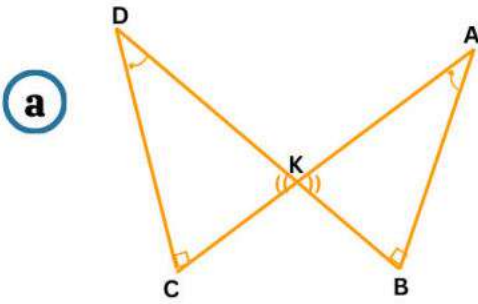
$m(\angle ABD) = 40^\circ$, $CD = DA$
 $m(\angle BCD) = 110^\circ$, $m(\angle DBC) = 30^\circ$
 $AB = 7cm$

Find:

- a) The length of BC b) The measure of $m(\angle BAD)$



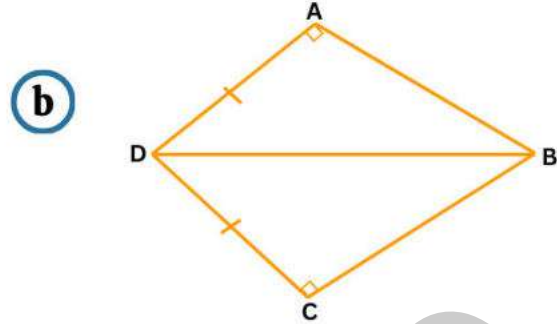
6 In each of the following figures, determine whether the two triangles are congruent or not. If they are congruent, state the congruence rule.



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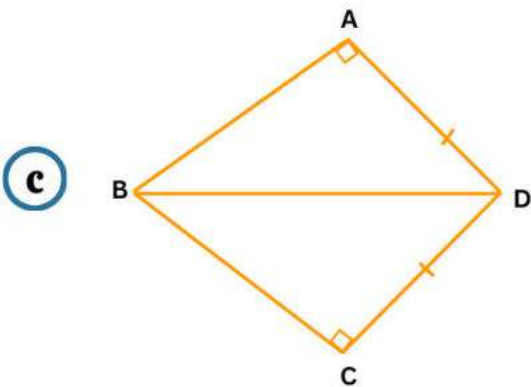
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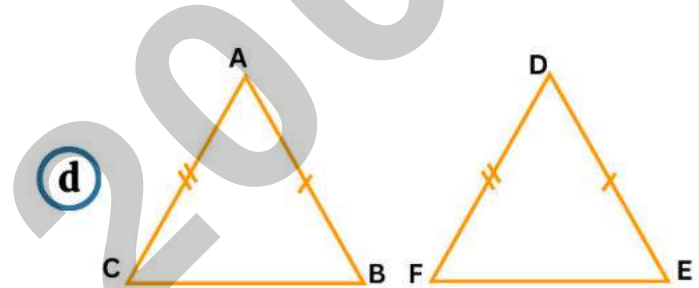
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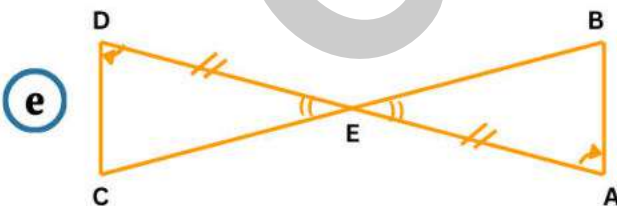
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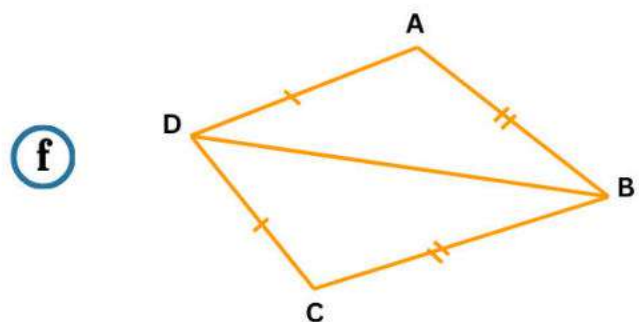
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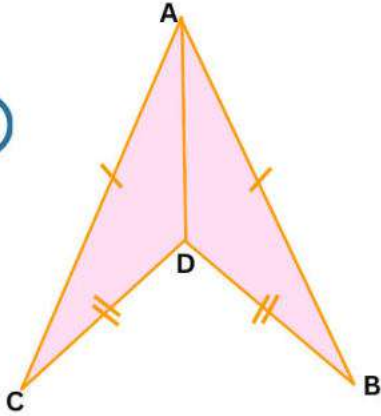


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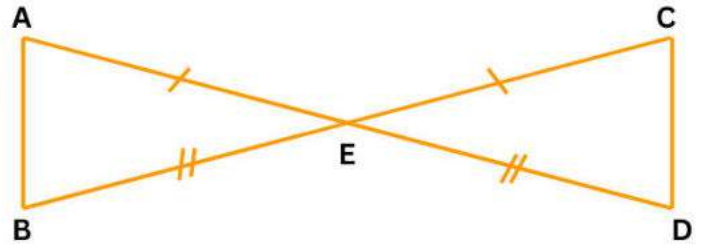
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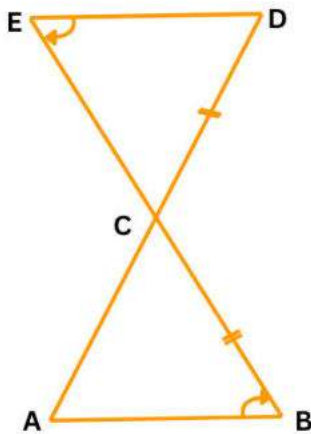
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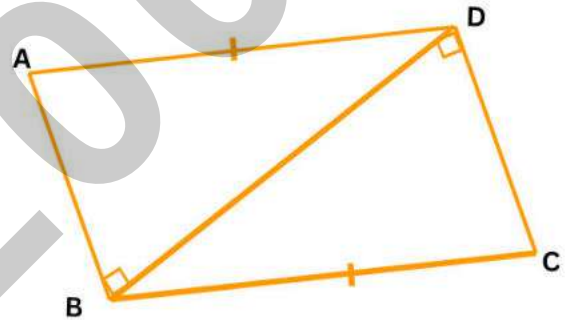
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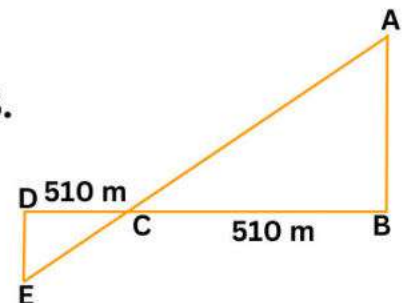
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7 To build a bridge like AB over a river ,
you need to find the distance from point A to point B.
Points E , C and A lie on the same straight line as
shown in the figure. If DE =600 ,
What is the distance from point A to point B



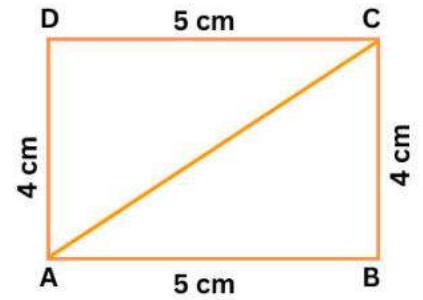
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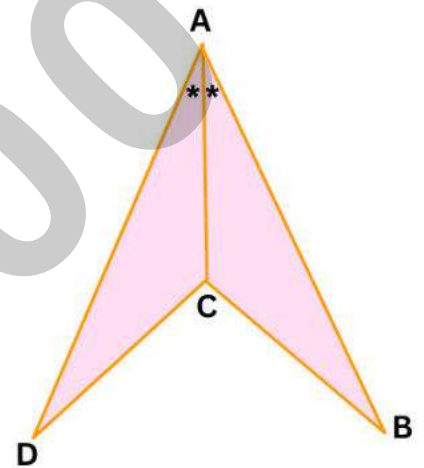
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8 what is the congruence rule used to prove that the triangles are congruent in each of the following cases ?

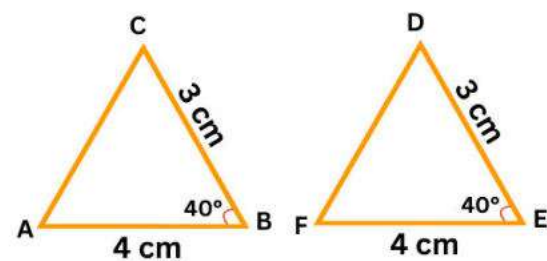
a



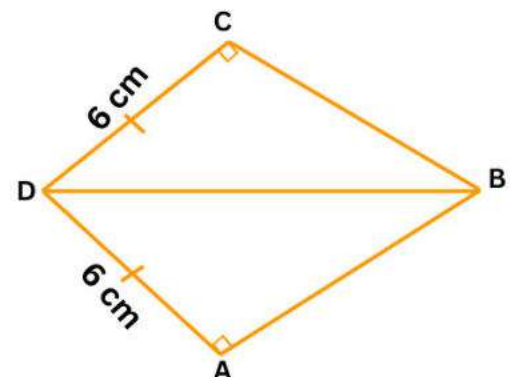
b



c



d

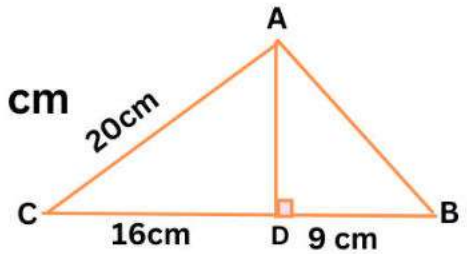


Q1: Answer the following:

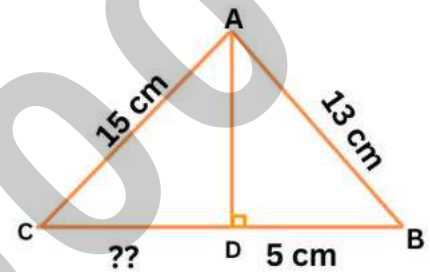
- 1 $BD = 9 \text{ cm}$, $\overline{AD} \perp \overline{BC}$, $CD = 16 \text{ cm}$, $AC = 20 \text{ cm}$

Find:

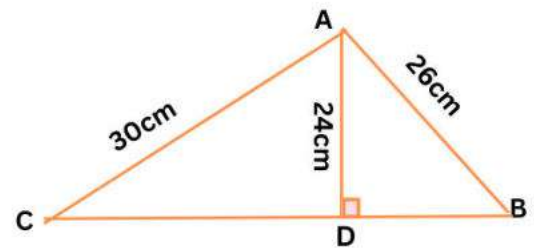
- (a) AB (b) AD (c) space $\triangle ABC$



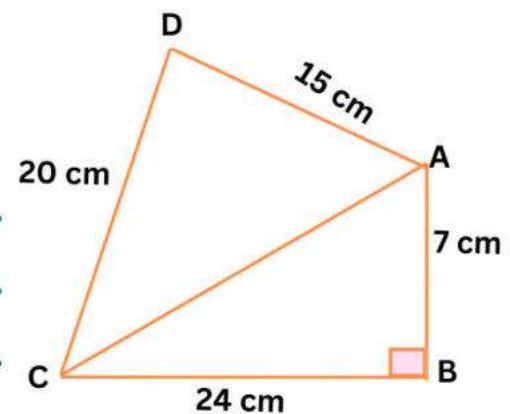
- 2 $AC = 15 \text{ cm}$, $AB = 13 \text{ cm}$
 $\overline{AD} \perp \overline{BC}$ So that $D \in \overline{BC}$
 $BD = 5 \text{ cm}$
Find the length: DC



- 3 $AD = 24 \text{ cm}$, $\overline{CB} \perp \overline{AB}$
 $AB = 26 \text{ cm}$, $AC = 30 \text{ cm}$
Find: CB , space $\triangle ABC$



- 4 $m(\angle ABC) = 90^\circ$, $AB = 7 \text{ cm}$, $BC = 24 \text{ cm}$,
 $CD = 20 \text{ cm}$, $DA = 15 \text{ cm}$
Prove that $m(\angle ADC) = 90^\circ$

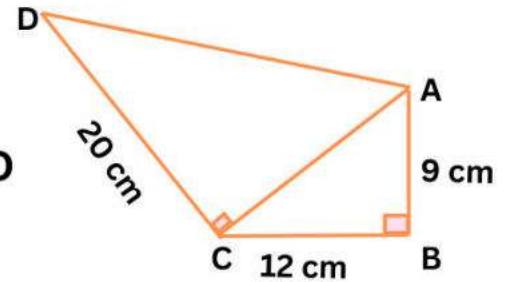


5 $m\angle(B) = m\angle(ACD) = 90^\circ$

$AB = 9 \text{ cm}$, $BC = 12 \text{ cm}$, $DC = 20 \text{ cm}$

Find: **a** $\overline{AC}$ **b** $\overline{AD}$ **c** shape space ABCD

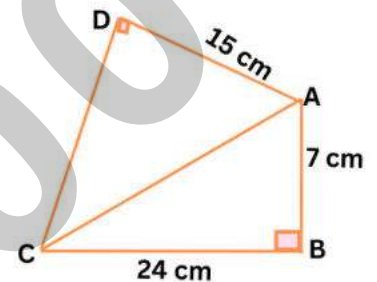
d the perimeter of the shape ABCD



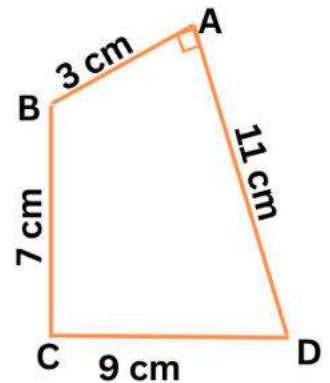
6 $m\angle(ABC) = m\angle(ADC) = 90^\circ$

$AB = 7 \text{ cm}$, $BC = 24 \text{ cm}$, $AD = 15 \text{ cm}$

Find the length of each $\overline{CD}$, $\overline{AC}$

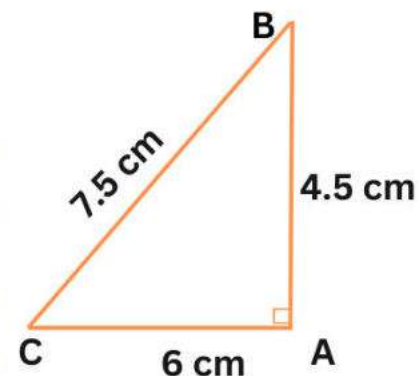


7 Prove that: $m\angle c = 90^\circ$



8 Triangle ABC : $AC = 6 \text{ cm}$, $BC = 7.5$, $AB = 4.5 \text{ cm}$

Prove that $\triangle ABC$ is a right angle



Q2 : In each following, state the type of triangle with respect to its angles, if the length of its sides are as follows:

1 $\sqrt{6}cm, \sqrt{5}cm, \sqrt{7}cm$

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2 $35cm, 28cm, 21cm$

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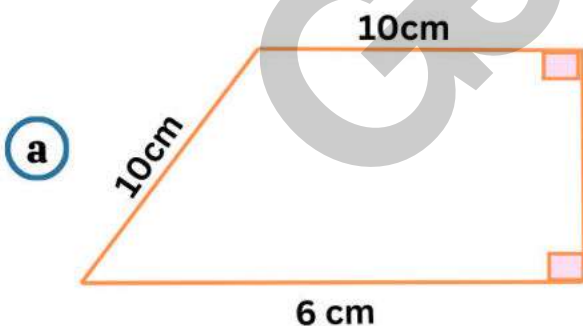
3 $6cm, 3cm, 5cm$

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Q3 : Find the area of each of the two opposite shapes :



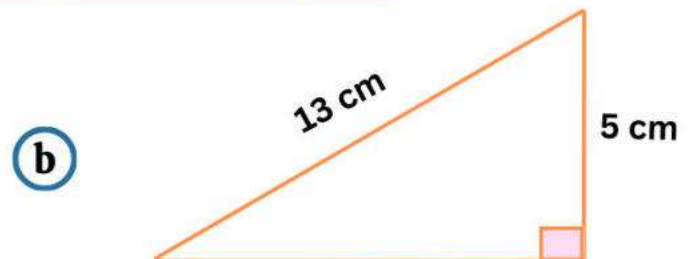
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Q4 : Determine the type of angle required :

1 Select type $(\angle B)$ in $(\triangle ABC)$ if it was :

AB = 10 cm , BC = 12 cm , CA = 15 cm

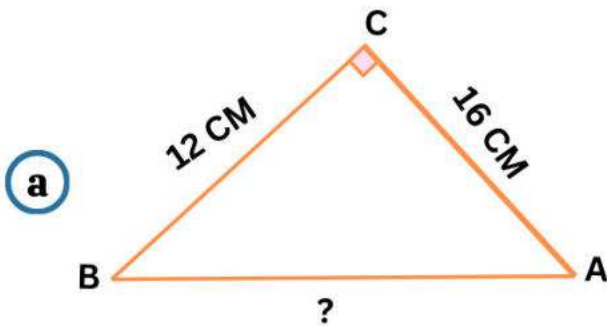
2 Select type $(\angle B)$ in $(\triangle ABC)$ if it was :

AB = 4 cm , BC = 5 cm , CA = 7 cm

3 Select type $(\angle B)$ in $(\triangle ABC)$ if it was :

BC = 10 cm , AB = 6 cm , AC = 8 cm

Q5 :Find the length of the side indicated by a question mark?



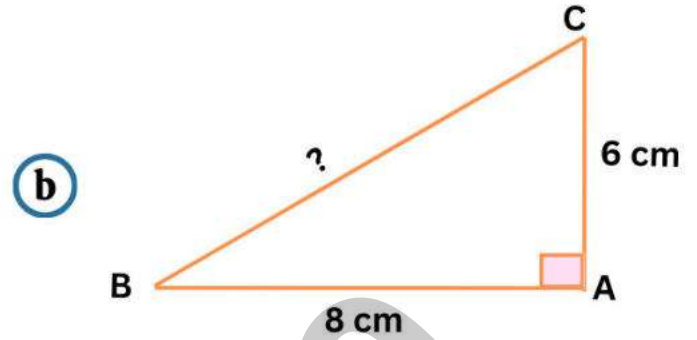
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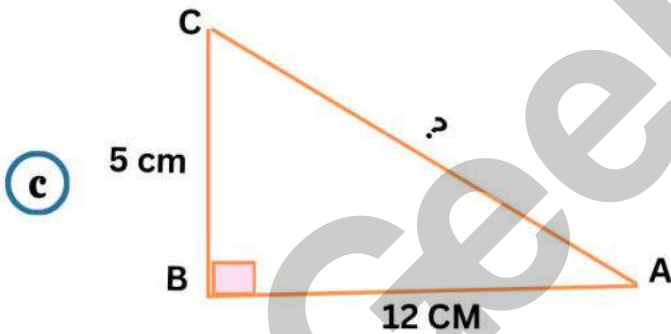
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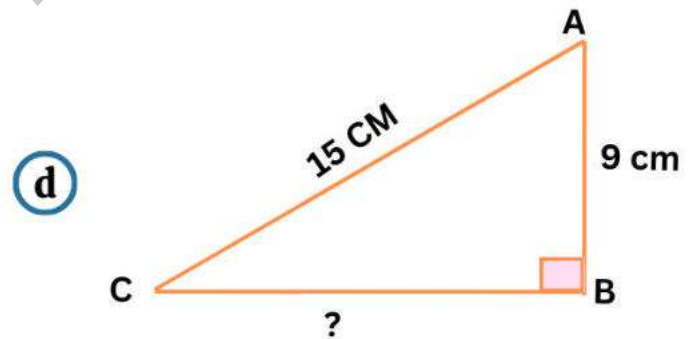
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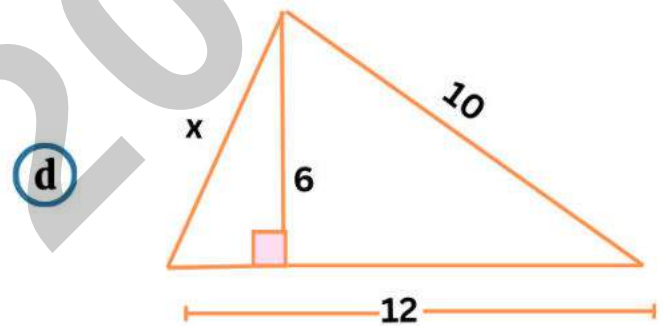
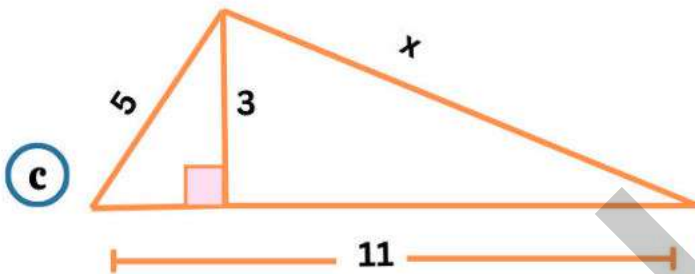
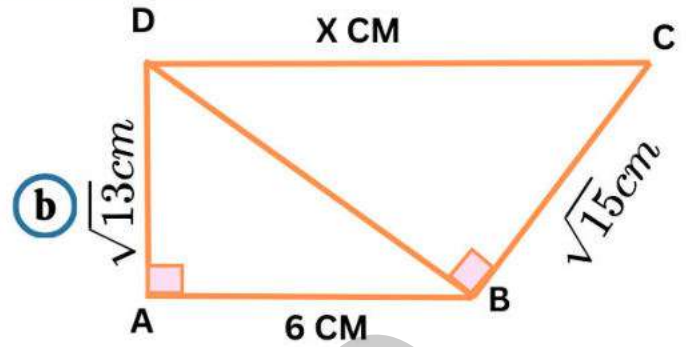
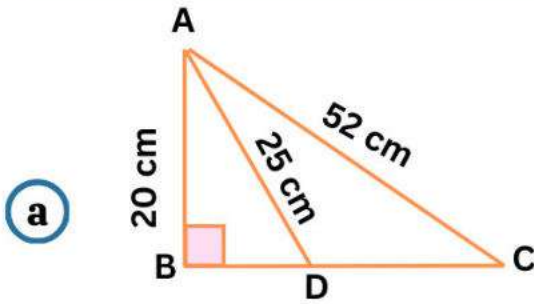
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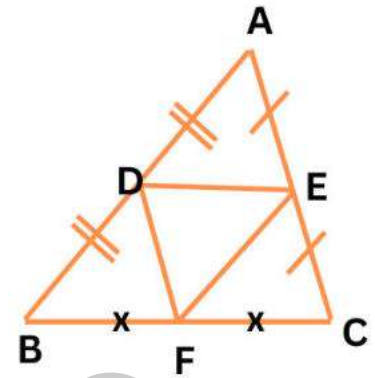
Q6 :Find the value of x in each the following :



Q1 : Choose the correct answer :-

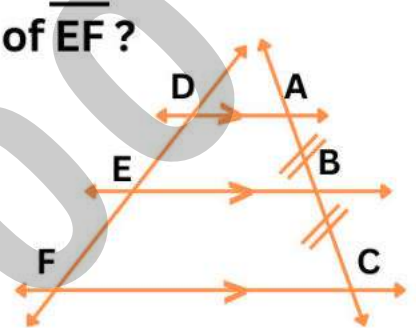
1 If perimeter of $\triangle ABC$ is 18 cm ,
What is the perimeter of $\triangle DEF$?

- (a) 6 cm (b) 9 cm
(c) 36 cm (d) 12 cm



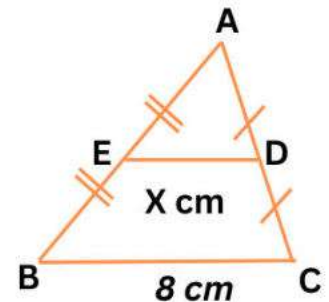
2 If the length of $\overline{DF}$ is 15 cm, What is the length of $\overline{EF}$?

- (a) 10 cm (b) 2.5 cm
(c) 7.5 cm (d) 5 cm



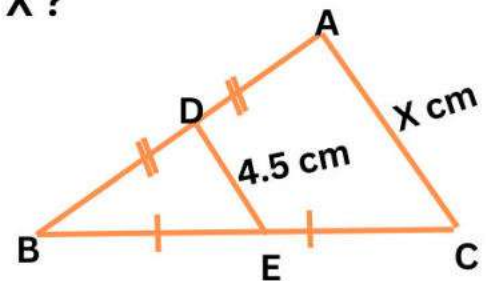
3 In the given figure :What is the value of X ?

- (a) 16 cm (b) 4 cm
(c) 8 cm (d) 2 cm



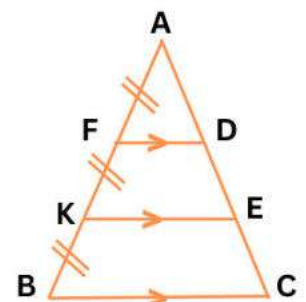
4 In the following figure :What is the value of X ?

- (a) 9 cm (b) 2.25 cm
(c) 13.5 cm (d) 4.5 cm



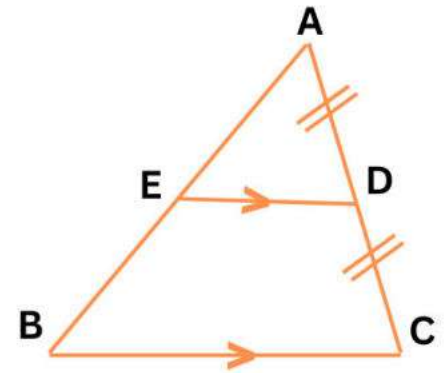
5 If $AC = 12$ cm , What is the length of AE

- (a) 3 cm (b) 6 cm
(c) 4 cm (d) 8 cm



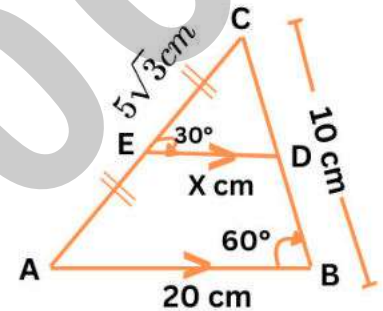
6 In the following figure :If $\overline{EB} = 10$ cm ,
What is the length $\overline{AB}$?

- (a) 20 cm (b) 10 cm
(c) 7.5 cm (d) 5 cm

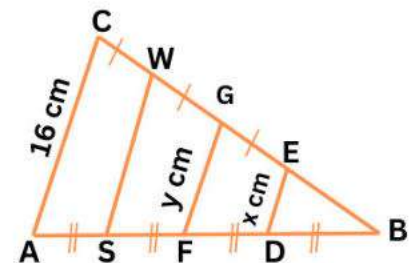


Q2 : In each of the following figures , Find the value of both X ,y :

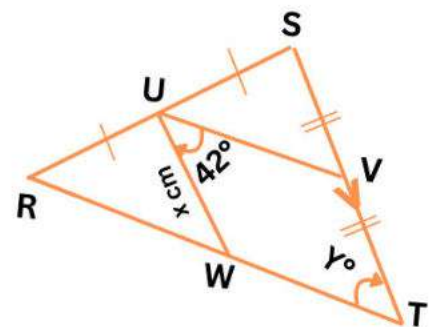
a



b

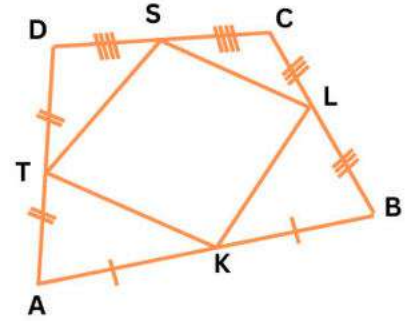


c

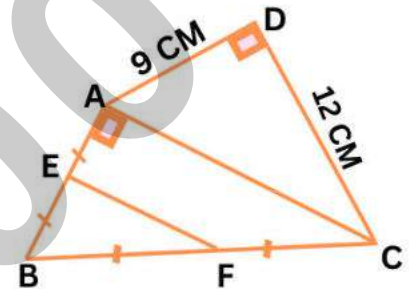


Q3 : Answer the following:

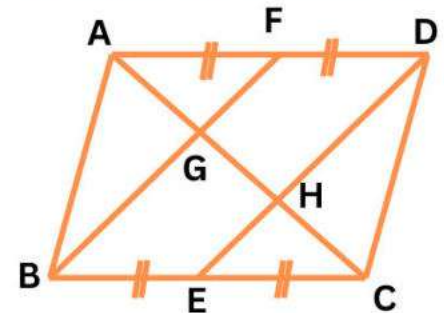
- 1** T, S, L, K are the midpoints of the sides of the quadrilateral ABCD
Prove that the shape KLS T is a parallelogram.



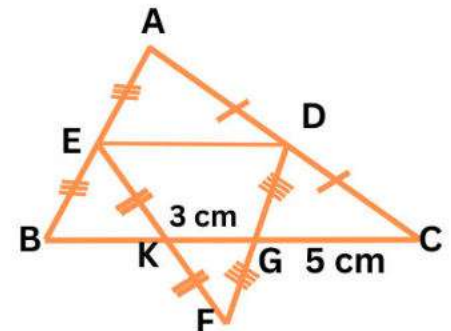
- 2** ABCD is a quadrilateral where
F, E are the midpoints $\overline{BC}$, $\overline{AB}$ respectively
Find the area of $\triangle BEF$



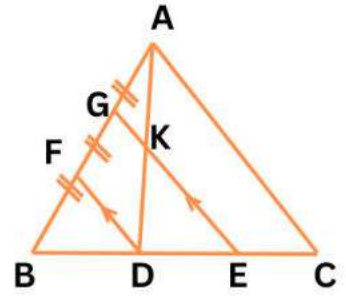
- 3** ABCD is a parallelogram If F, E are the midpoints of $\overline{AD}$, $\overline{BC}$ respectively,
Prove that : $AC = 3 AG$



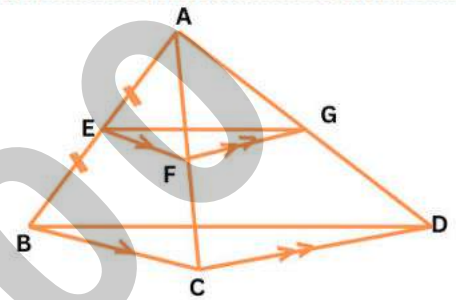
- 4** In the opposite figure:
Find ,With proof ,the length of $\overline{BK}$



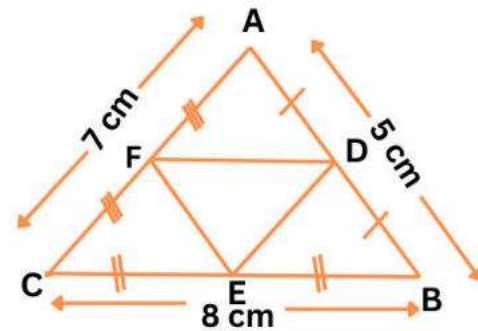
- 5 $GK = 8 \text{ cm}$, $\overline{FD} \parallel \overline{GE}$
 $AG = GF = FB$
 Find the length of $\overline{KE}$



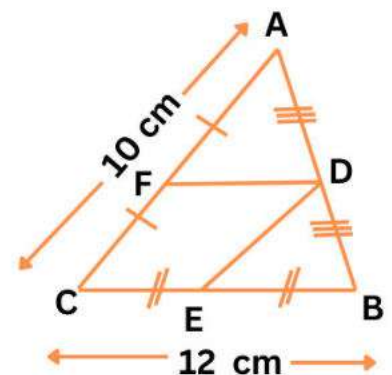
- 6 If E is the midpoint of $\overline{AB}$, $\overline{EF} \parallel \overline{BC}$, $\overline{FG} \parallel \overline{CD}$
 Prove that $BD = 2 EG$



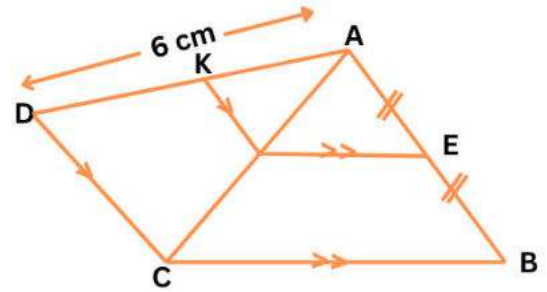
- 7 $CH = 7 \text{ cm}$, $BC = 8 \text{ cm}$, $AB = 5 \text{ cm}$
 F, E, D are the midpoints of $\overline{CA}$, $\overline{BC}$, $\overline{AB}$ respectively. Find the perimeter of $\triangle DEF$



- 8 In the opposite figure:
 ABC is a triangle where F, E, D are the midpoints of $\overline{CA}$, $\overline{BC}$, $\overline{AB}$ respectively,
 $BC = 12 \text{ cm}$, $AC = 10 \text{ cm}$
 Find the perimeter of the shape DECF.



- 9 $\overline{AE} = \overline{EB}$, $\overline{BC} \parallel \overline{EF}$
 $\overline{CD} \parallel \overline{FK}$, $\overline{AD} = 6 \text{ cm}$
 Find the length of $\overline{AK}$



- 10 the adjacent figure represents
 a wooden bookshelf in the
 shape of an equilateral triangle
 with a side length 3 meters ,
 containing three glass shelves
 inside

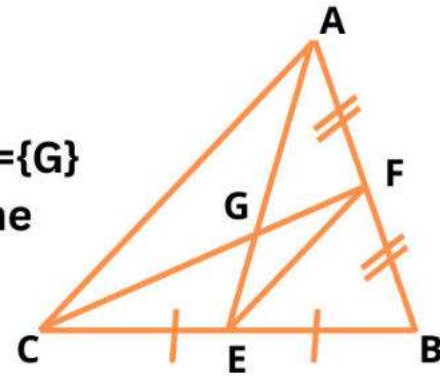
What is the length of each of
 the three shelves?



Q1 : Choose the correct answer :-

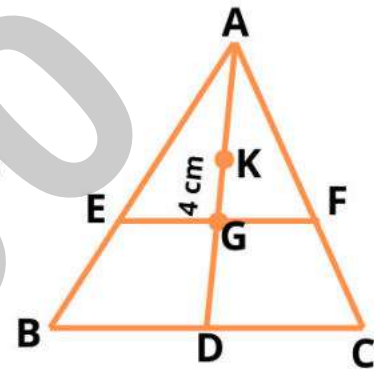
- 1 $\overline{CF}$, $\overline{AF}$ are medians in triangle ABC and $\overline{AE} \cap \overline{CF} = \{G\}$
 $CG = 12$ cm, $AE = 15$ cm, $AC = 20$ cm, What is the the perimeter of triangle GFE?

- (a) 18 cm (b) 21 cm
 (c) 24 cm (d) 27 cm



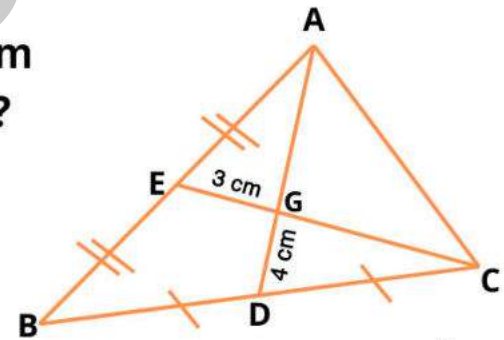
- 2 If G is the centroid of triangle ABC, and K is the centroid of triangle AEF, What is the length of $\overline{GD}$?

- (a) 2 cm (b) 4 cm
 (c) 6 cm (d) 8 cm



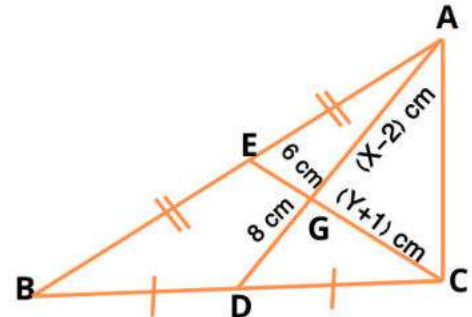
- 3 If G is the centroid of triangle ABC, $GE = 3$ cm
 $GD = 4$ cm, which of the following is correct?

- (a) $AG = 6$ cm (b) $CG = 8$ cm
 (c) $CE = 9$ cm (d) $AG = 12$ cm



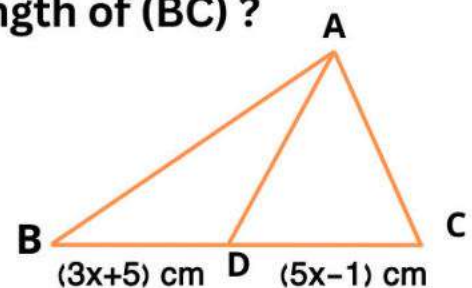
- 4 In the following figure : $x - y = \text{-----}$?

- (a) 0 (b) 7
 (c) 14 (d) 29



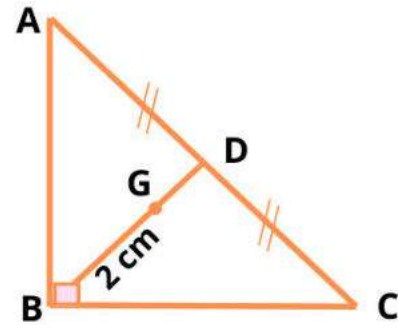
- 5 $\overline{AD}$ is a median in triangle ABC. What is the length of (BC) ?

- (a) 6 cm (b) 3 cm
 (c) 14 cm (d) 28 cm



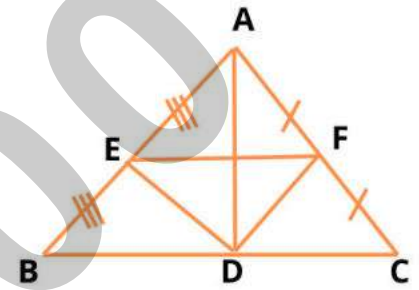
- 6 If G the centroid of the right-angled triangle ABC with the right angle at B, and $GD = 2$ cm, What is the length of $\overline{AC}$?

- (a) 8 cm (b) 12 cm
(c) 18 cm (d) 24 cm

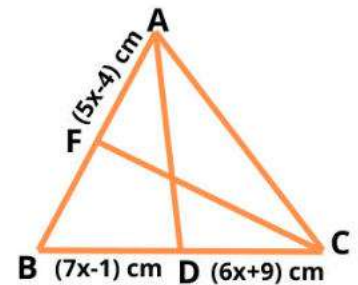


Q2: Answer the following:

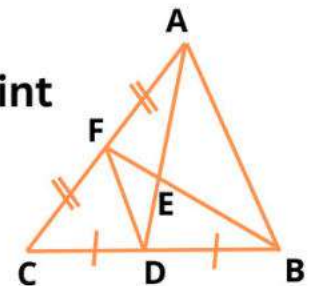
- 1 Triangle ABC where $\overline{AD} \perp \overline{BC}$, EF are the midpoints of AB, AC respectively. Prove that: the perimeter of triangle EFD = $\frac{1}{2}$ the perimeter of triangle ABC.



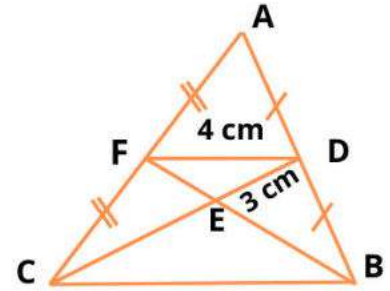
- 2 If $\overline{AD}$, $\overline{CF}$ are medians in triangle ABC, Find the length of $\overline{FB}$.



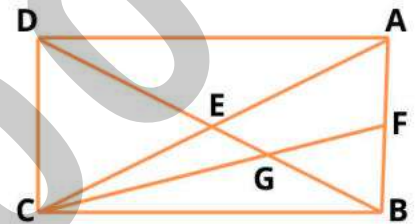
- 3 Triangle ABC has: D is midpoint of $\overline{BC}$, F is the midpoint of $\overline{AC}$, $\overline{AD} \cap \overline{BF} = \{E\}$, if $AD = 6$ cm, $AB = BF = 9$ cm Find the perimeter of triangle $\triangle EDF$.



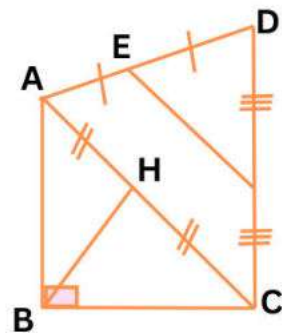
- 4 IF D , F are midpoints of $\overline{AB}$, $\overline{AC}$ respectively,
 $\overline{BF} \cap \overline{DC} = \{E\}$, $DE = 3 \text{ cm}$. $\overline{BF} = 6 \text{ cm}$. $\overline{DF} = 4 \text{ cm}$
Find the perimeter of triangle $\triangle BEC$.



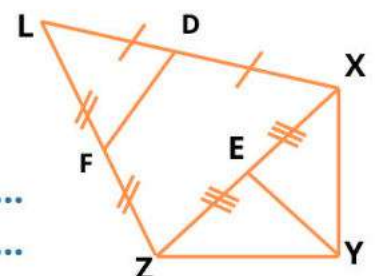
- 5 ABCD is a rectangle with its diagonals intersecting at E , F the midpoint of $\overline{AB}$, and $\overline{CF} \cap \overline{BD} = \{G\}$.
a Prove that :G is the point of intersecting of the medians of triangle ABC.
b If $BG = 4 \text{ cm}$, Find the length of $\overline{AE}$



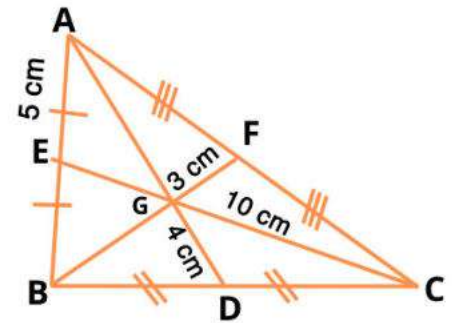
- 6 If $\overline{BH}$ is a median in triangle ABC , which is right-angled at B ,and F ,E are the midpoint of $\overline{CD}$, $\overline{AD}$ respectively.
Prover that : $\overline{BH} = \overline{EF}$



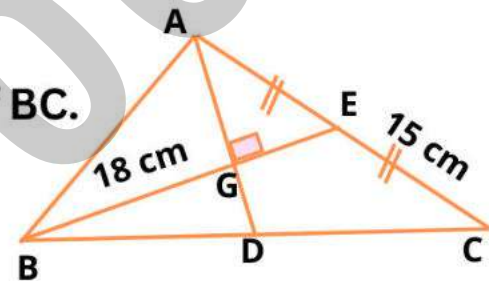
- 7 $(\angle XYZ) = 90^\circ$, D is the midpoint of segment $\overline{XL}$, F is the midpoint of segment $\overline{ZL}$, E is the midpoint of segment $\overline{XZ}$.
prove that $\overline{FD} = \overline{EY}$



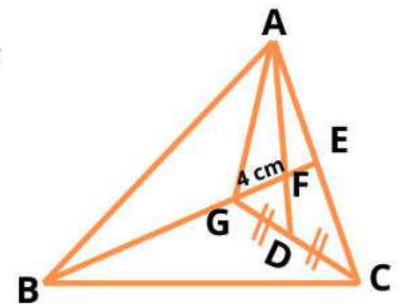
- 8 G is the centroid of triangle ABC , $AE = 5$ cm ,
 $CG = 10$ cm , $GD = 4$ cm , $GF = 3$ cm
Prove and find the area of triangle ABD .



- 9 If E is the midpoint of AC , F is the midpoint of BC.
 $\overline{AD} \perp \overline{BE}$, $CE = 15$ cm , $BG = 18$ cm.
Find with proof the length of $\overline{AD}$



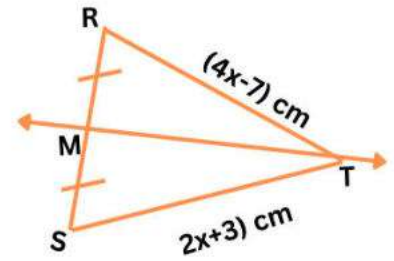
- 10 G is the point of intersection of the medians of
triangle ABC , $DC = DG$, $GF = 4$ cm
Find , with proof , the length of $\overline{BE}$



Q1 : Choose the correct answer :-

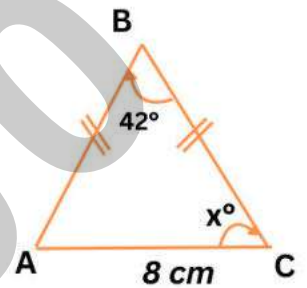
1 In the given figure :
What is the value of x ?

- (a) 7 (b) 10
(c) 5 (d) 3



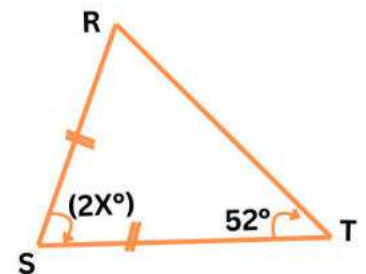
2 In the given figure :
What is the value of x ?

- (a) 42 (b) 21
(c) 84 (d) 69



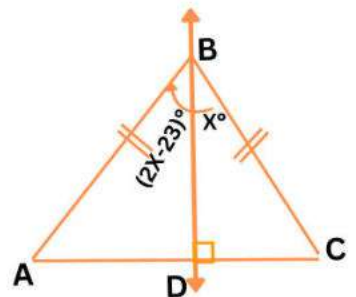
3 In the given figure :
What is the value of X ?

- (a) 26 (b) 52
(c) 76 (d) 38



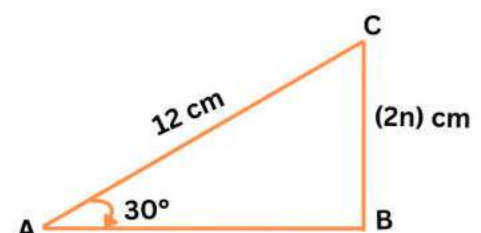
4 In the following figure :
What is the measure of $\angle C$?

- (a) 23° (b) 46°
(c) 67° (d) 60°



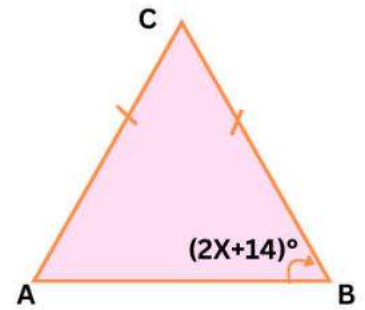
5 In the given figure:
What is the value of n ?

- (a) 6 (b) 3
(c) 12 (d) 9



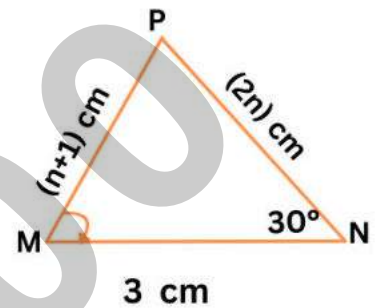
- 6** In the given figure :
What is the value of x ?

(a) 46 (b) 23
(c) 60 (d) 37



- 7** In the given figure :
What is the length of PN?

(a) 8 cm (b) 3 cm
(c) 6 cm (d) 4 cm



- 8** If the length of two sides in an isosceles triangle are 3 cm and 7 cm,
What is the length of the third side ?

(a) 3 (b) 7 (c) 10 (d) 4

- 9** Triangle ABC is right-angled at A , $AB = AC$. Then : $m(\angle B)$ =-----

(a) 30° (b) 45° (c) 60° (d) 90°

- 10** In $\triangle XYZ$ if : $ZX = XY = YZ$ then : $m(\angle x)$ =-----

(a) 30° (b) 180° (c) 60° (d) 90°

- 11** LMN a triangle in which : $MN = LM$, $m(\angle m) = 70^\circ$, then : $m(\angle N)$ =-----

(a) 20° (b) 35° (c) 55° (d) 70°

- 12** In triangle ABC , if $AB = AC$, $m(\angle c) = 65^\circ$, then $m(\angle A)$ =

(a) 30° (b) 50° (c) 55° (d) 130°

13 The measure of the exterior angle of an equilateral triangle is-----

- (a) 60° (b) 90° (c) 120° (d) 180°

14 In triangle XYZ, if $XZ = YZ$, $m\angle(z) = 120^\circ$, then $m\angle(x) =$

- (a) 60° (b) 90° (c) 120° (d) 30°

Q2 : In each of the following figures , Find the value of both X :

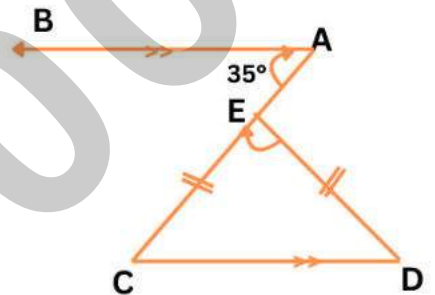
(a)

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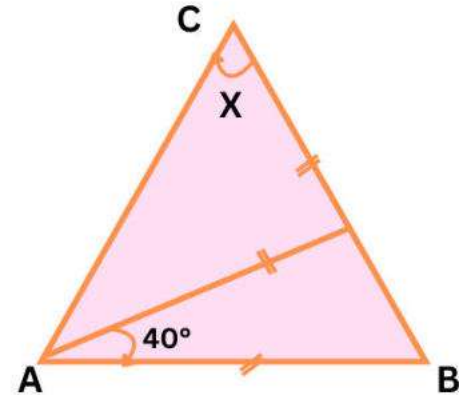
(b)

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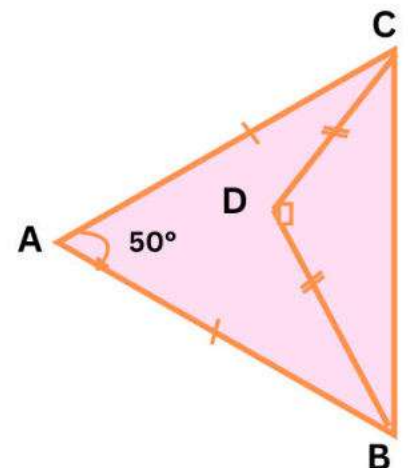
(c)

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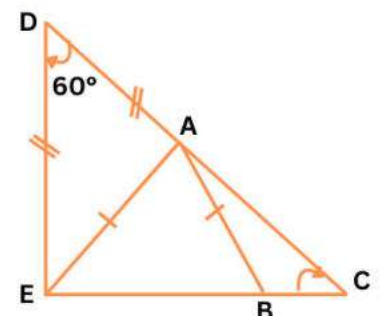
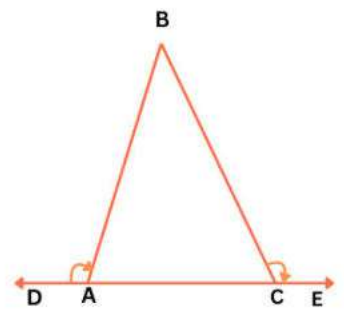
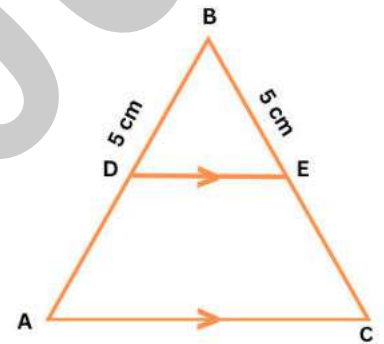
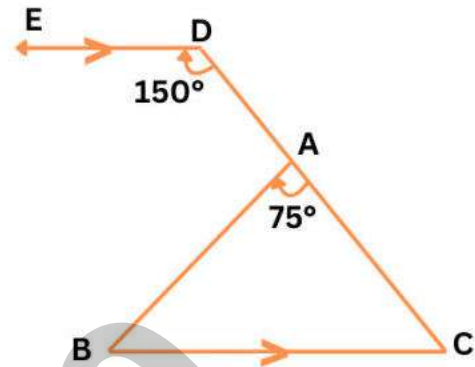
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Q3 : In each of the figures , Prove that triangle ABC isosceles:



a

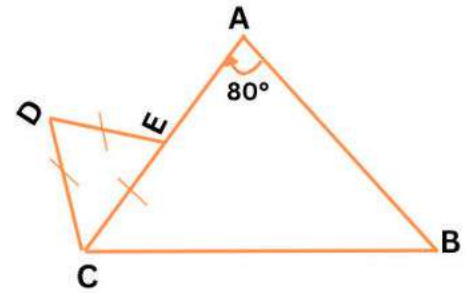
b

c

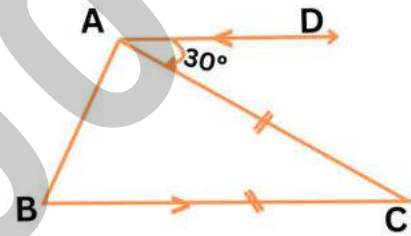
d

Q4 : Answer the following:

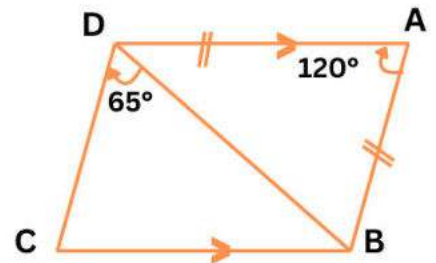
- 1 $AB = AC, m(\angle BAC) = 80^\circ$
 $CD = DE = CE$
 Prove that : $m(\angle BCD) = 90^\circ$



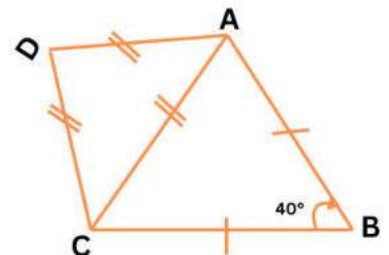
- 2 ABC a triangle in with : $AC = BC$
 $BC \parallel AD, m(\angle DAC) = 30^\circ$
 Find the measure of the angles of triangle ABC .



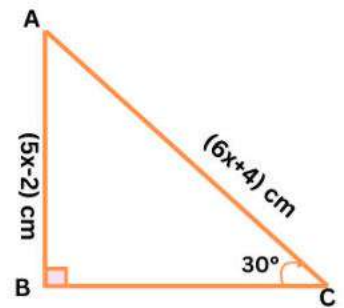
- 3 $AD = AB, \overline{BC} \parallel \overline{AD}$
 $m(\angle BAD) = 120^\circ, m(\angle BDC) = 65^\circ$
 Find: $m(\angle ADB)$
 Find: $m(\angle C)$



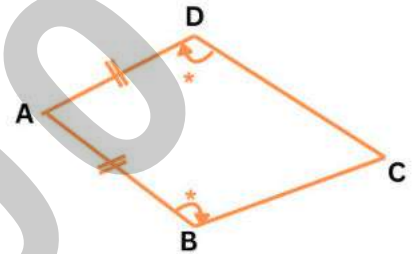
- 4 $AC = DC = AD, BC = AB$
 $m(\angle ABC) = 40^\circ$
 Find: $m(\angle BAD)$



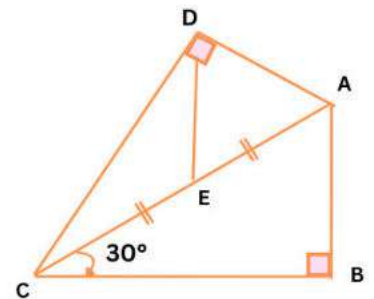
- 5 In the given figure
Find the length of AC ,
Then find the area of the triangle ABC



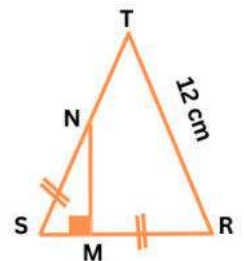
- 6 ABCD a quadrilateral in with : $AD = AB$
 $m(\angle ABC) = m(\angle ADC)$
Prove that : $BC = DC$



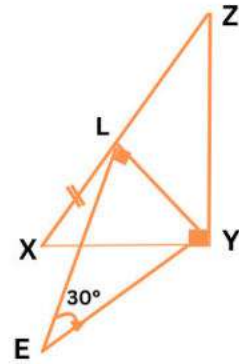
- 7 $m(\angle ABC) = m(\angle ADC) = 90^\circ$
 $m(\angle ACB) = 30^\circ$
E midpoint AC
Prove that : $AB = DE$



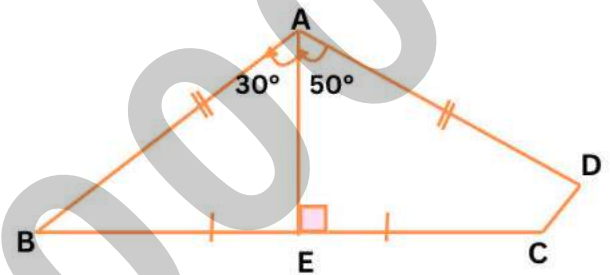
- 8 Triangle SRT equilateral triangle with side length 12 cm
 $SR \perp NM$, $SN = MR$
Find , With proof : NM



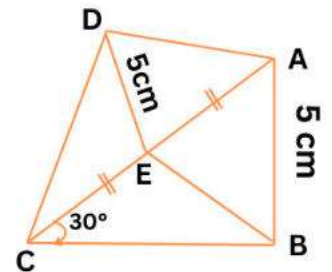
- 9** $m(\angle E) = 30^\circ$, $m(\angle YLE) = 90^\circ$
 $YE = 10 \text{ cm}$, $m(\angle XYZ) = 90^\circ$
 L midpoint XZ
 Find the length of XZ by proof.



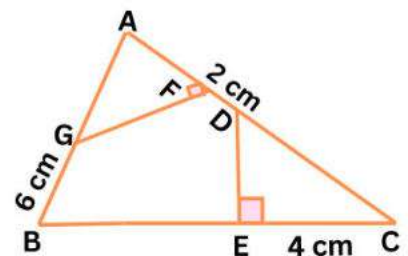
- 10** In the given figure
 Find : $m(\angle D)$



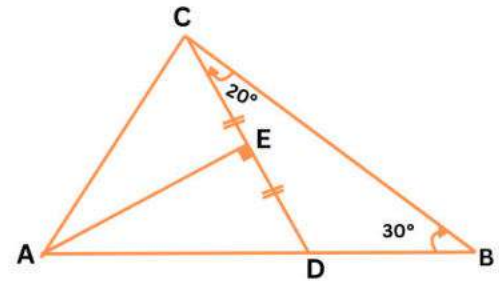
- 11** Triangle ABC is right-angled at $\angle B$
 $AB = 5 \text{ cm}$, $m(\angle ACB) = 30^\circ$
 E midpoint AC, If $DE = 5 \text{ cm}$
 Prove that, $m(\angle ADC) = 90^\circ$



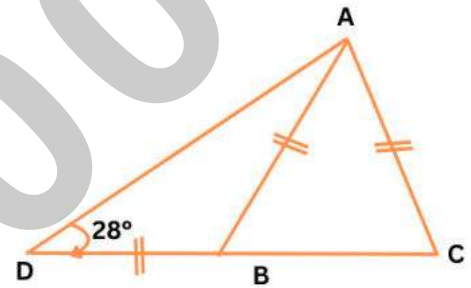
- 12** In the given figure :
 Triangle ABC is equilateral .
 $EC = 4 \text{ cm}$, $FD = 2 \text{ cm}$, $GB = 6 \text{ cm}$
 Find with proof the perimeter of triangle $\triangle ABC$



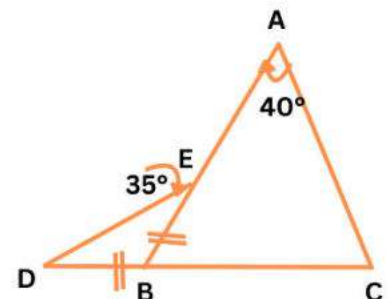
- 13** In the given figure :
 $m(\angle B) = 30^\circ$, $m(\angle DCB) = 20^\circ$
 $CD \perp AE$, $CE = DE$
 Find , With proof $m(\angle CAE)$



- 14** In the given figure
 $B \in CD$
 $m(\angle D) = 28^\circ$
 Find ,With proof: $m(\angle CAD)$

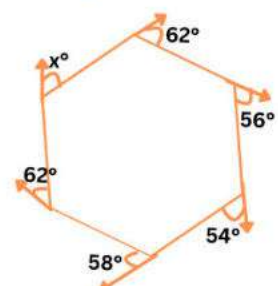
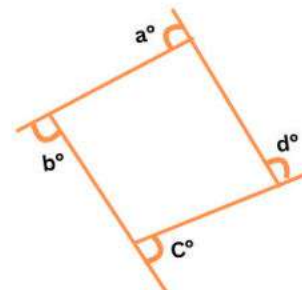


- 15** In the given figure :
 $D \in CB$
 $m(\angle A) = 40^\circ$, $m(\angle DEB) = 35^\circ$
 $BE = BD$
 Prove that $AB = AC$



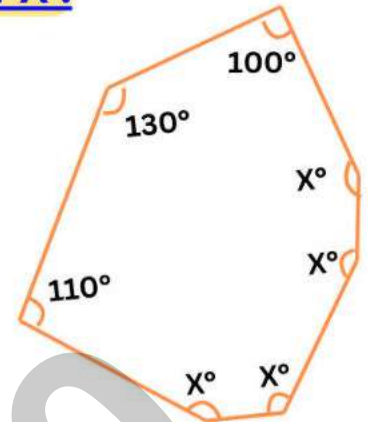
Q1 : Choose the correct answer.

- 1 How many diagonals does a convex heptagon on have ?
(a) 7 (b) 11 (c) 13 (d) 14
- 2 How many sides does a regular polygon have if one of its exterior angles measures 20° ?
(a) 12 (b) 14 (c) 16 (d) 18
- 3 What is the sum of the measures of the interior of convex hexagon?
(a) 900° (b) 720° (c) 540° (d) 360°
- 4 What is the measure of interior angle of a regular 18-sided polygon?
(a) 135° (b) 144° (c) 150° (d) 160°
- 5 How many sides does a regular polygon have if one of its interior angles measures 144° ?
(a) 10 (b) 11 (c) 12 (d) 14
- 6 How many sides does a convex polygon have if one of its interior angles is 2340° ?
(a) 12 (b) 13 (c) 14 (d) 15
- 7 In the given figure :
What is the value of $a + b + c + d$?
(a) 180 (b) 360
(c) 540 (d) 720
- 8 In the given figure :
What is the value of X ?
(a) 58 (b) 62
(c) 68 (d) 72

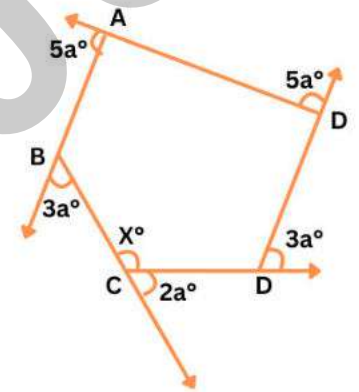


Q2 : In each of following figure , Find the value of X :

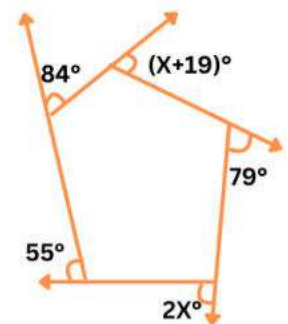
a



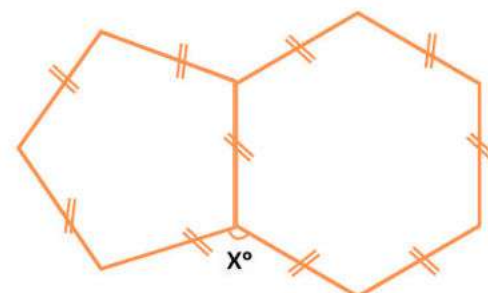
b

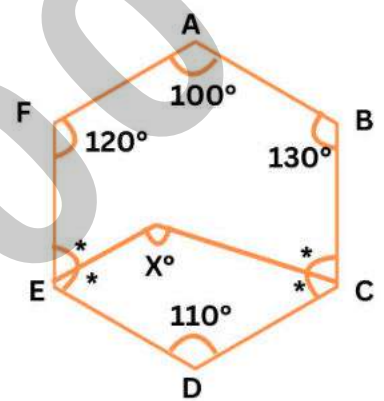
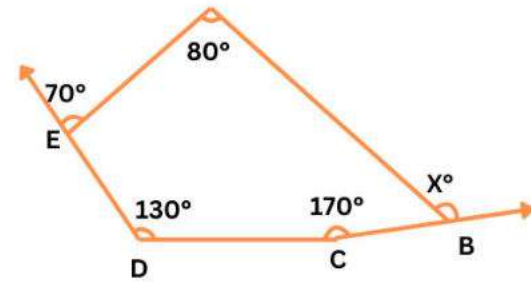


c

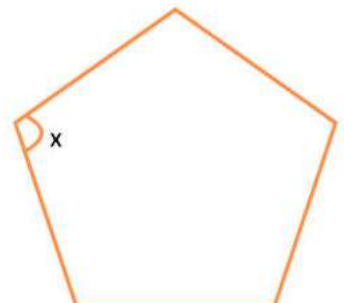
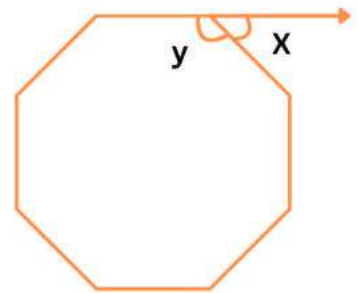


d





Q3 : In each of following figure ,if polygon is regular ,find the measures of the unknown angles :



a

b

Q4 : Answer the following :

- 1 If the measure of the exterior angle of a regular polygon is 30° ,
How many sides does this polygon have ?
What is sum of the measures of its interior angles ?

“ 1800° , 12”

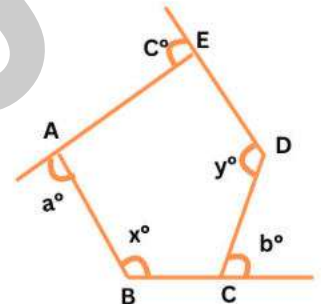
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- 2 In the opposite figure :
 $X + y = 230$
Find the value of $a + b + c$ with proof .



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- 3 Find the measure of the interior angle of each of the following regular polygons :



.....

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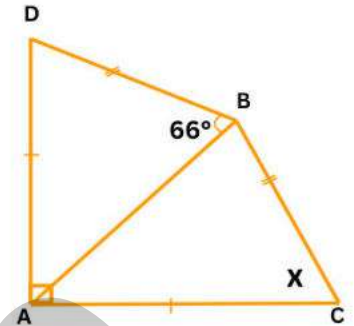
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Q1: Choose the correct answer :-

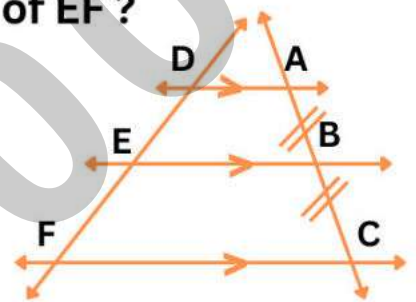
1 In the following figure :What is the value of X ?

- (a) 66 (b) 69
(c) 45 (d) 34



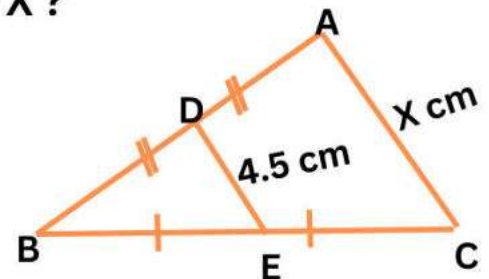
2 If the length of $\overline{DF}$ is 15 cm, What is the length of $\overline{EF}$?

- (a) 10 cm (b) 2.5 cm
(c) 7.5 cm (d) 5 cm



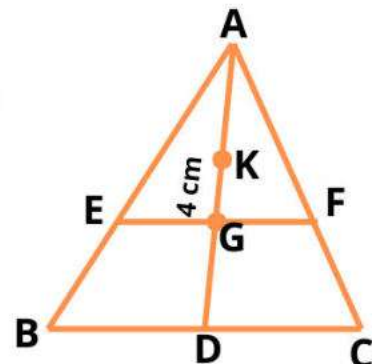
3 In the following figure :What is the value of X ?

- (a) 9 cm (b) 2.25 cm
(c) 13.5 cm (d) 4.5 cm



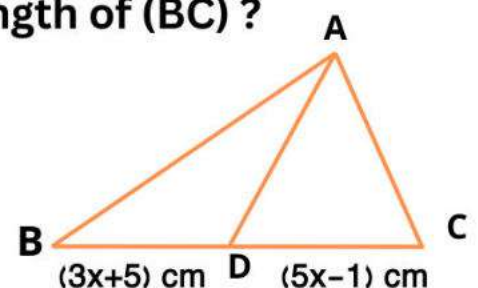
4 If G is the centroid of triangle ABC , and K is the centroid of triangle AEF , What is the length of $\overline{GD}$?

- (a) 2 cm (b) 4 cm
(c) 6 cm (d) 8 cm



5 $\overline{AD}$ is a median in triangle ABC. What is the length of (BC) ?

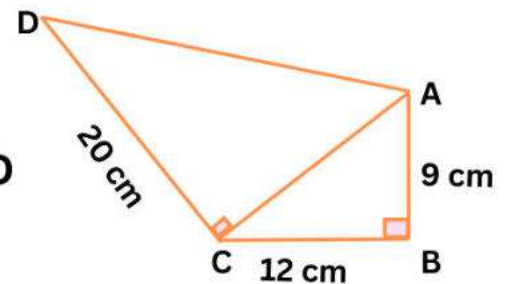
- (a) 6 cm (b) 3 cm
(c) 14 cm (d) 28 cm



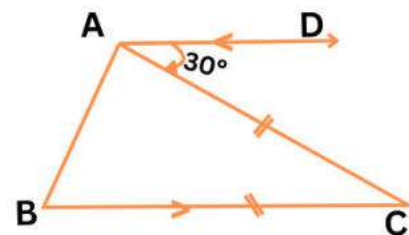
- 6 If the length of two sides in an isosceles triangle are 3 cm and 7 cm, What is the length of the third side ?
 (a) 3 (b) 7 (c) 10 (d) 4
- 7 In triangle ABC , if $AB = AC$, $m(\angle C) = 65^\circ$, then $m(\angle A) =$
 (a) 30° (b) 50° (c) 55° (d) 130°
- 8 What is the sum of the measures of the interior of convex hexagon?
 (a) 900° (b) 720° (c) 540° (d) 360°
- 6 How many sides does a convex polygon have if one of its interior angles is 2340° ?
 (a) 12 (b) 13 (c) 14 (d) 15

Q2 : Answer the following :

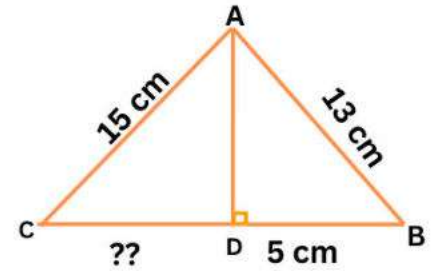
- 1 $m\angle(B) = m(\angle ACD) = 90^\circ$
 $AB = 9 \text{ cm}$, $BC = 12 \text{ cm}$, $DC = 20 \text{ cm}$
 Find: (a) $\overline{AC}$ (b) $\overline{AD}$ (c) shape space ABCD
 (d) the perimeter of the shape ABCD



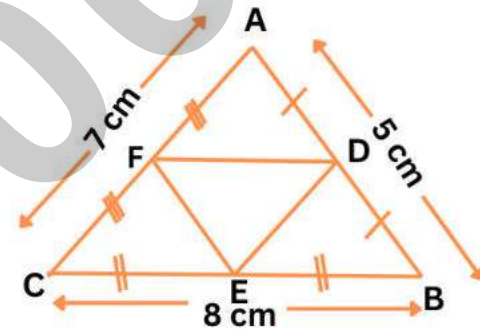
- 2 ABC a triangle in with : $AC = BC$
 $BC \parallel AD$, $m(\angle DAC) = 30^\circ$
 Find the measure of the angles of triangle ABC .



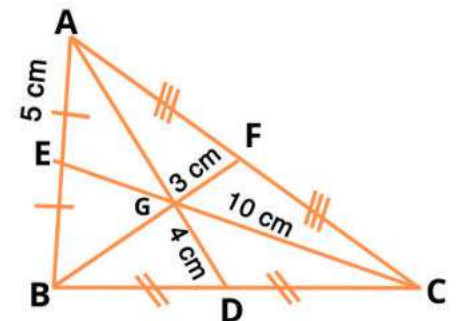
- 3 $AC = 15 \text{ cm}$, $AB = 13 \text{ cm}$
 $\overline{AD} \perp \overline{BC}$ So that $DE \parallel \overline{BC}$
 $BD = 15 \text{ cm}$
 Find the length : $\overline{DC}$



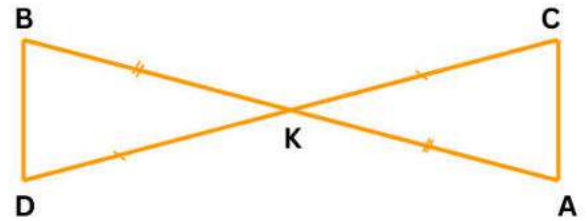
- 4 $CH = 7 \text{ cm}$, $BC = 8 \text{ cm}$, $AB = 5 \text{ cm}$
 F , E , D are the midpoints of $\overline{CA}$, $\overline{BC}$, $\overline{AB}$
 respectively . Find the perimeter of $\triangle DEF$



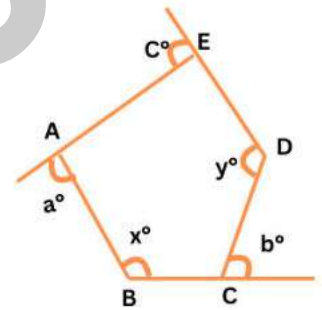
- 5 G is the centroid of triangle ABC , $AE = 5 \text{ cm}$,
 $CG = 10 \text{ cm}$, $GD = 4 \text{ cm}$, $GF = 3 \text{ cm}$
 Prove and find the area of triangle ABD .



- 6 In the given figure:
 $BK = AK$, $AB \cap CD = \{K\}$, $DK = CK$
 Are $\triangle AKC$ and $\triangle BKD$ congruent ? Why ?

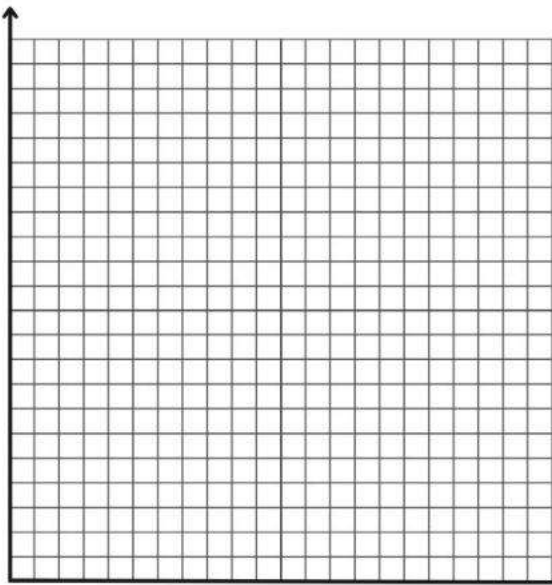


- 7 In the opposite figure :
 $X + y = 230$
 Find the value of $a + b + c$ with proof .



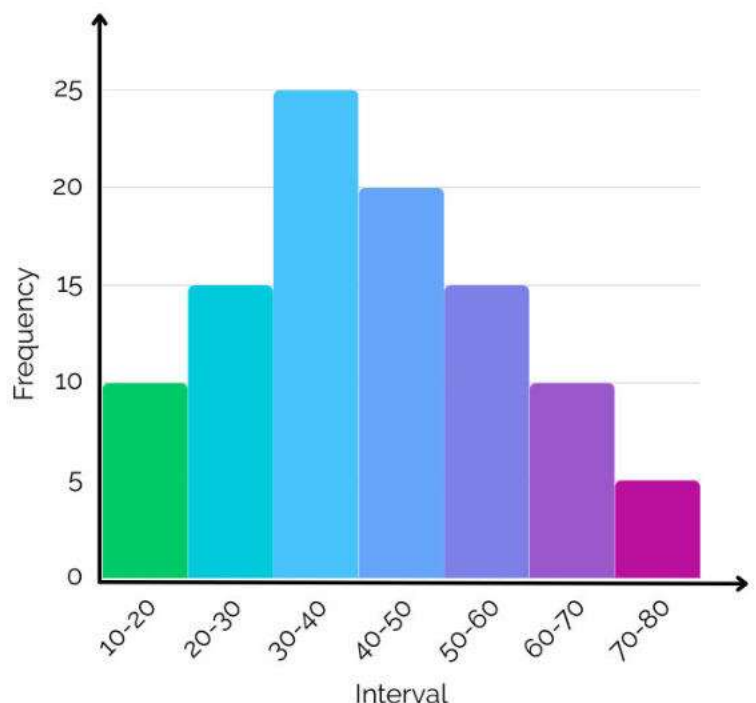
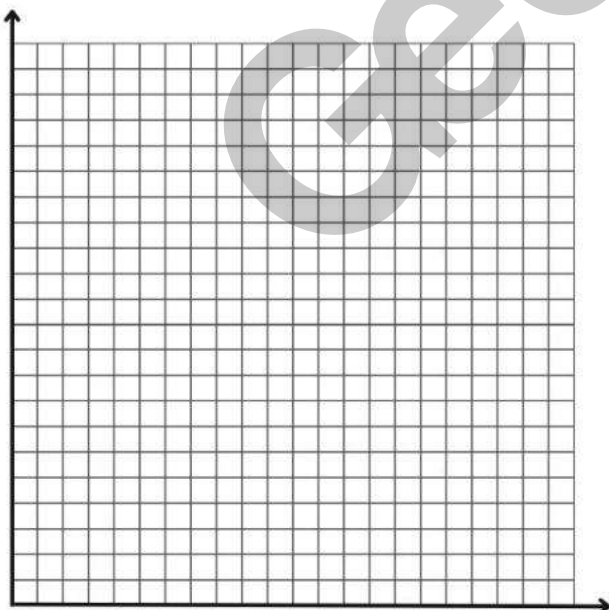
Q1 : Answer the following

- 1** The following table: Shows the time for delivering fast food restaurants.
creat an ascending clustered frequency table and represent it graphically

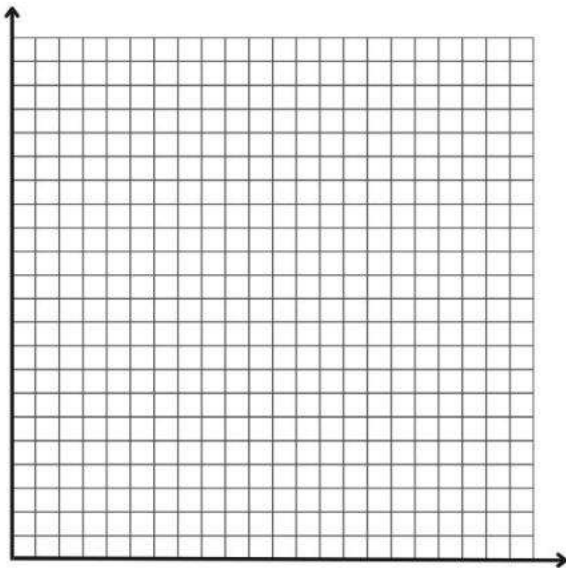


Periods(time in minutes)	Repetition(number of meals)
-75	11
-120	24
-165	10
-210	3
-255	2

- 2** From the corresponding histogram form the table
Ascending recursive clustering, and represent it graphically



- 3** The management of one of the factories studied the time spent on The arrival of workers to the factory, in order to determine the most appropriate means mobility; In order to preserve the employees' and workers' time
Create an ascending clustered frequency table, and represent it graphically.



Periods(time in minutes)	Repetition(number of employees)
-0	6
-20	39
-40	31
-60	14
-80	6
-100	4

- 4** The figure opposite represents the cumulative upward curve of the scores of a class of 40 students on an exam.

- 1** How many students got less than 12 marks?

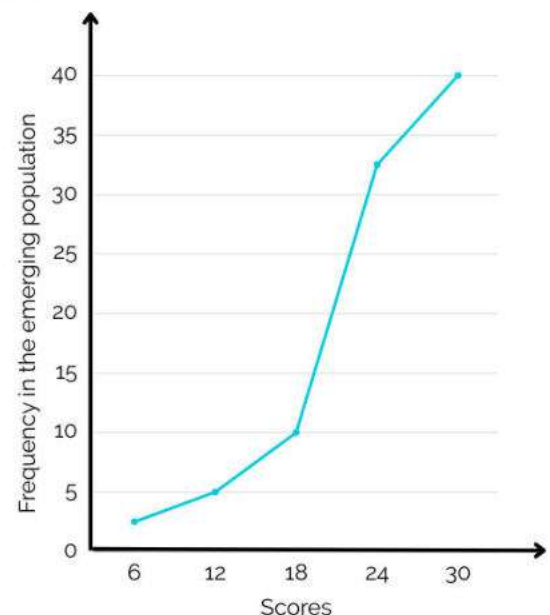
(a) 5 (b) 10 (c) 20 (d) 40

- 2** How many students scored 18 or more?

(a) 20 (b) 30 (c) 35 (d) 40

- 3** What percentage of students scored less than 6?

(a) 5% (b) 10% (c) 15% (d) 20%

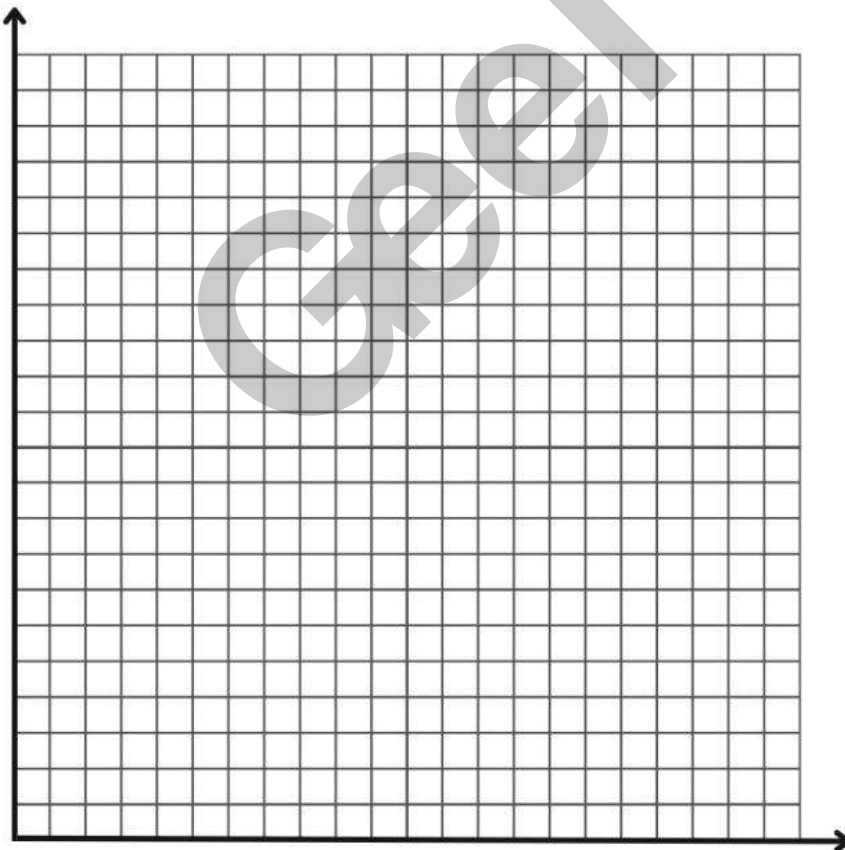


- 5** The following table : Shows the number of houses of different sizes (measured in square meters) .

Periods(M ²)	-100	-150	-200	-250	-300	-350
Repetition	5	23	27	21	9	5

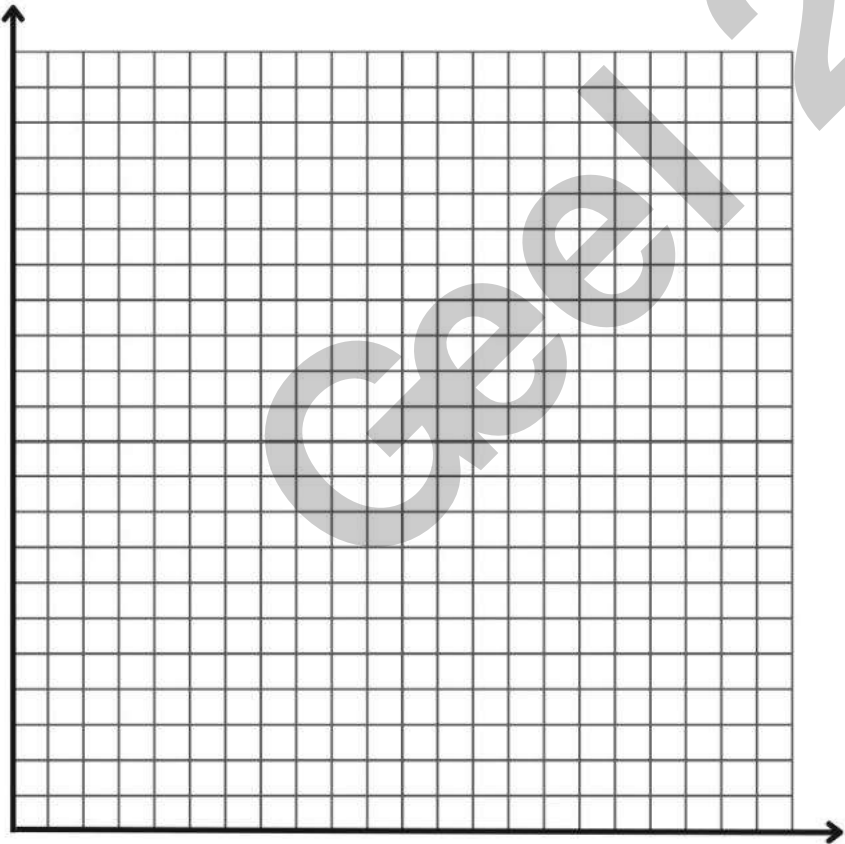
Create an ascending clustered frequency table and represent graphically .

- a** Find the number of houses with an area of less than 300 square meters.
.....
- b** Find the number of houses with an area of 150 square meters or more
.....
- c** Find the percentage of homes with an area of 250 square meters or more
.....



6 shows the clustered frequency distribution Rising grades for 100 students in the second year of middle school Mathematics subject.

- a** How many students scored less than 25?
- b** How many students scored 30 or more?
- c** Create a frequency table with groups



The upper bounds of the groups	Ascending clustered iteration
less tan 5	0
less tan 10	10
less tan 15	36
less tan 20	61
less tan 25	79
less tan 30	89
less tan 35	95
less tan 40	100

- 7** The corresponding pie chart shows the number of tourists To the Khan Al-Khalili area one day, according to their age in years (....., -30, -20). If the total number of tourists is 600 tourists, Construct an ascending clustered frequency table and graph it.

.....

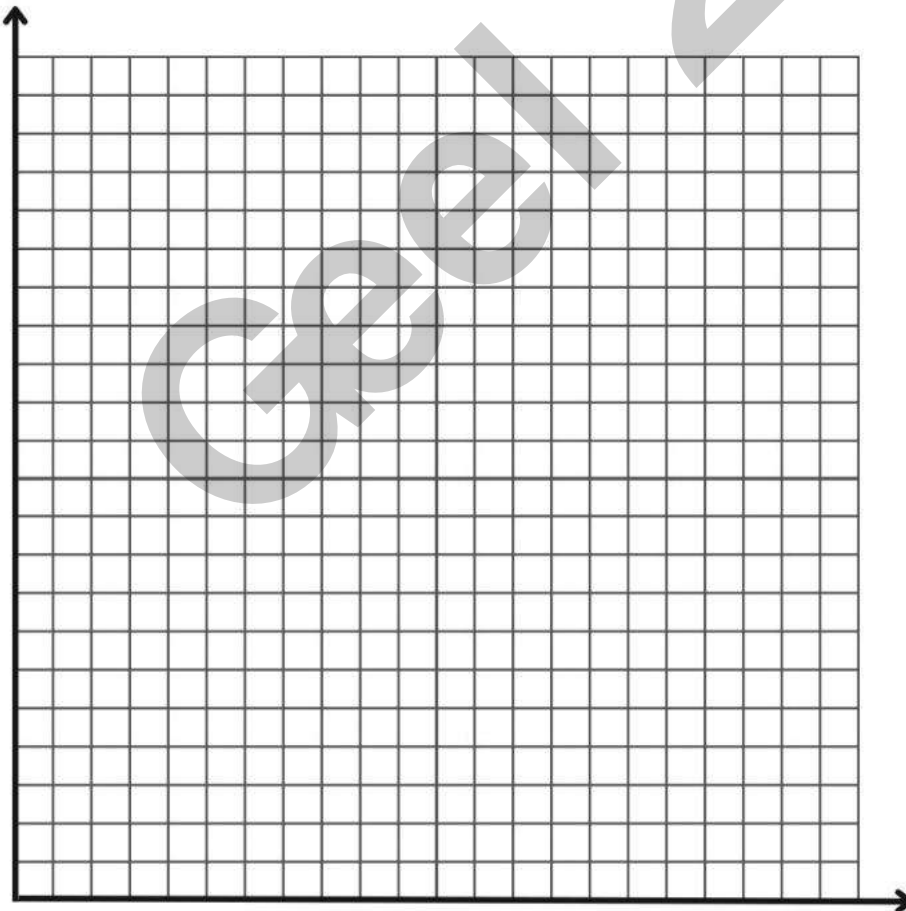
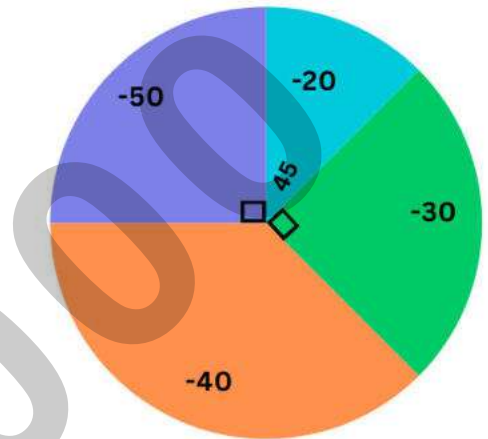
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Q1: Choose the correct answer.

1 If it was $\sum FXm = 800, \sum F = 50$,What is the arithmetic mean X ?
 (a) 160 (b) 16 (c) 850 (d) 750

2 What is the position of the second group in the groups of
 -5 , -15 , -25 - 35 ?
 (a) 10 (b) 20 (c) 5 (d) 15

3 If the upper limit of a set is 18 and its center is 15.5 , What is the lower
 limit of this set ?
 (a) 12 (b) 12.5 (c) 13 (d) 13.5

4 The following frequency table shows the grades of 150 students in
 mathematics.

Grades	4-	12-	20-	28-	36-	44-	52-	total
Repetition	15	3k	4k	32	25	22	14	150

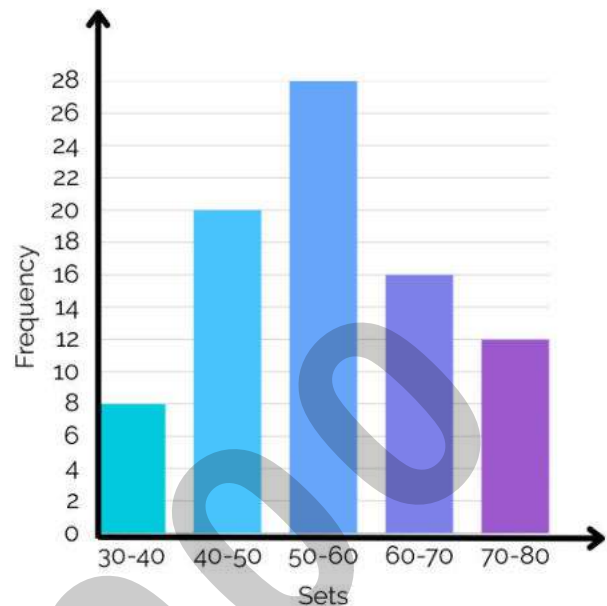
1 What is the value of K ?
 (a) 4 (b) 5 (c) 6 (d) 7

2 What is the value of the mediator ?
 (a) 28 (b) 32.5 (c) 34.5 (d) 36

3 What is the order of the mediator ?
 (a) 37.5 (b) 75 (c) 112.5 (d) 150

5 From the corresponding frequency histogram ,
What is the modal interval ?

- (a) -30 (b) -40
(c) -50 (d) -70



6 The following table shows the number of weekly working hours for
40 workers in a factory ,
What is the value of the mediator ?

- (a) 28.75 (b) 30.25
(c) 24.75 (d) 31.25

Upper limit of groups	repetition
less tan 20	0
less tan 24	2
less tan 28	7
less tan 32	23
less tan 36	35
less tan 40	38
less tan 44	40
less tan 40	100

Q2 : Answer the following:

- 1** The following table shows the frequency distribution of the scores of 40 students on one of the tests

Groups	-5	-10	-15	-20	-25	the total
Repetition	K	10	3K	8	K+2	40

Find a value k, then estimate the value of the median

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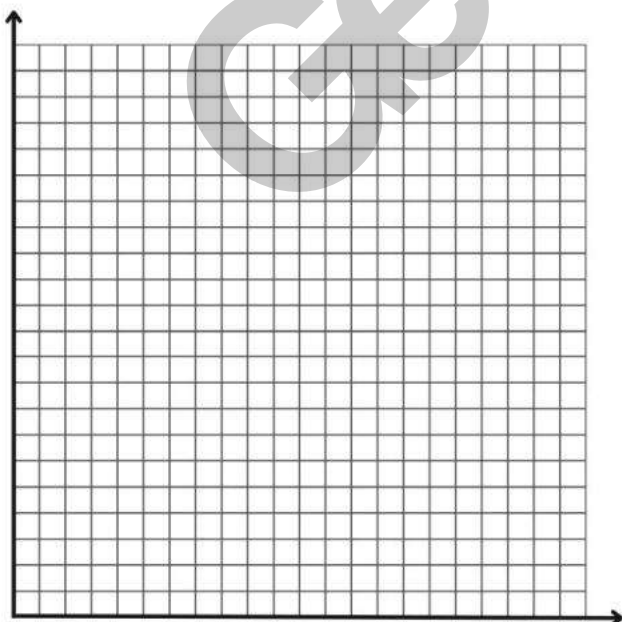
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- 2** The following table shows the masses(in kilograms) of 40 people to join a weight loss program

periods	70-	80-	90-	100-	25-	120-	130-
Repetition	2	5	9	12	7	3	2

Estimate the median graphically



- 3** The following table shows average daily student expenditure in a school for Fifty students in the second tear of middle school .

Spending(in pounds)	-0	-10	-20	-30	-40	-50
Repetition	7	12	15	9	5	2

Estimate the arithmetic mean of daily spending

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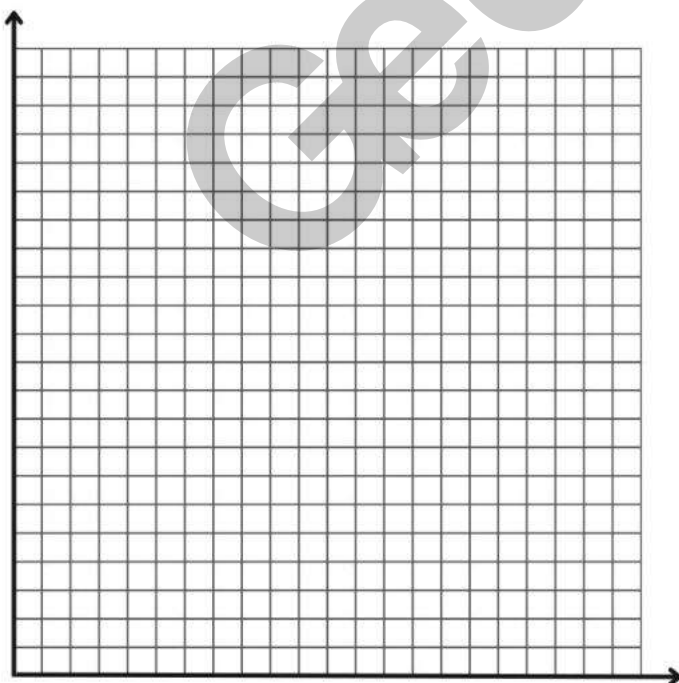
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- 4** The following table shows the ages of teacher enrolled in facility safety and security training course education

Ages (years)	-26	-30	-34	-38	-24	-46
Repetition	4	10	28	35	15	8

Draw the histogram and estimate the normal age from it.



- 5** The following table shows the monthly electricity consumption in kilowatt- hours for 100 homes.

periods (kwh)	0-	100-	200-	300-	400-	500-	600-
Numbers of houses	4	10	28	35	15	6	2

- a** Estimate the arithmetic mean of consumption
- b** Estimate the mediator
- c** Arrange the values if the metrics you obtained
- c** Appreciate the pattern in an ascending order